

# The National Geographic Magazine

AN ILLUSTRATED MONTHLY



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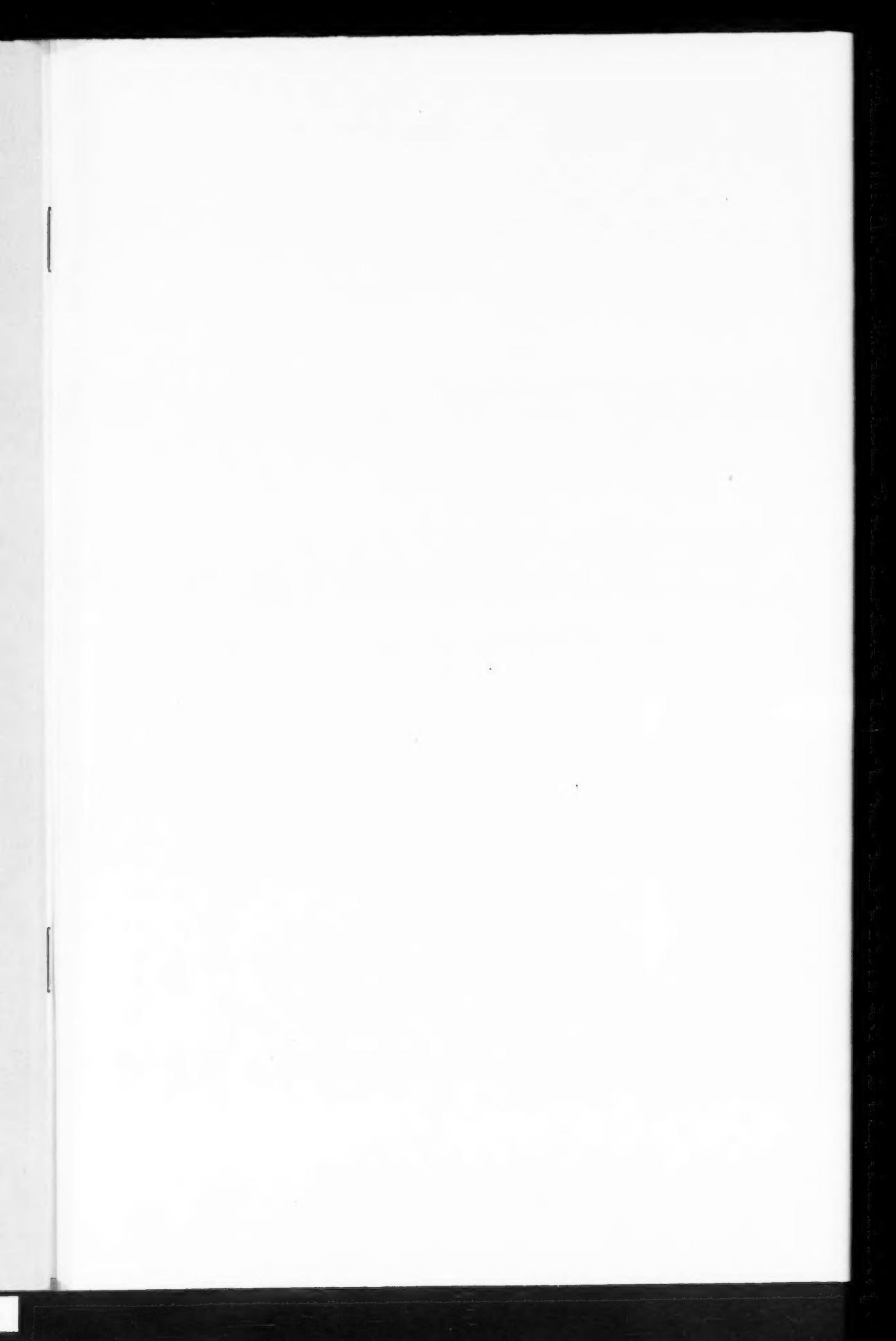
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## NATIONAL GEOGRAPHIC SOCIETY PROGRAM FOR MARCH, 1896.

### **Annual Reception, Arlington Hotel, March 12.**

Reception to the Venezuelan Commission, by the Society, at the Arlington Hotel from 9 to 12, Thursday evening, March 12.

Members can obtain extra tickets at \$1.50 each by application to the Secretary of the Society.

### **Friday Evening Lectures, 8 to 9.15 p. m., Metzerott Hall.**

Mar. 13.—A Voyage on a steam-whaler to the Antarctic Continent: HERR BORCHGREVINK, of Norway. (Lantern-slide illustrations.)

Mar. 27.—The geographic History of Currency: JAMES H. ECKELS.

### **Monday Afternoon Lenten Lectures, 4.15 to 5.30 p. m., Metzerott Hall.**

(Lantern-slide illustrations.)

Mar. 2.—Across the Canadian Plains to Banff, Alberta: W J MCGEE. Excursion to Mt. Rainier, Washington: BAILEY WILLIS.

Mar. 9.—Glaciers, Peaks, and Canyons of the Rockies: CHARLES E. FAY.

Mar. 16.—From the Canadian National Park to the Pacific: JAMES FLETCHER.

Mar. 23.—From Puget Sound to Sitka; Fiords, Islands, and Canals: A. P. NIBLACK.

Mar. 30.—The Glaciers of Alaska: HARRY FIELDING REID.

### **Technical Meetings, Cosmos Club Hall, 8 to 10 p. m.**

Mar. 6.—The Adaptations of Plants to Desert Environment: F. V. COVILLE. (Lantern-slide illustrations.)

Mar. 20.—On the physiographic Development of the District of Columbia Region: N. H. DARTON. (Lantern-slide illustrations.)  
Use of geodetic Control Lines in geographic Work: GILBERT THOMPSON.

Admission to meetings is by membership ticket, admitting two. Members can obtain extra tickets, each admitting one person to a single evening lecture, for fifty cents, at the office of the Secretary, 1517 H street; office hours, 10 A. M. to 12.30 P. M., and 3 to 5 P. M.; Saturdays, 10 A. M. to 1 P. M.

Extra tickets for the afternoon lectures, 25 cents each or \$1.50 for the course of seven lectures, can be obtained at the office of the Secretary or at Metzerott's music store.

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THE SO-CALLED "JEANNETTE RELICS"

By PROFESSOR WILLIAM H. DALL

Much interest has been excited by the recent rumor that news had been received from Nansen, via Siberia. In discussing the rumor I mentioned that the supposed relics of the *Jeannette* found off Julianehaab, in Greenland, were in all probability in no way connected with the *Jeannette* expedition, but were due to a boyish prank of some of the members of the Greely relief expedition of 1884. In attempting to formulate his impressions of an interview with me during which the subject was discussed, and which were not revised by me, the reporter unfortunately fell into some inaccuracies, not unnatural in a person unfamiliar with the technicalities of arctic exploration, but for which the telegrams to the press made me responsible. It seems desirable, therefore, to lay before those interested in such matters a statement of the facts bearing on the two questions involved, namely, Were the relics really derived from the *Jeannette* expedition? and, if not, were they the result of a mystification, as above suggested? The first is of course the only one of importance to geographers, for if the relics were spurious it matters but little whence they were derived. The facts are now in order.

1. The *Jeannette* sank June 11, 1881, in the Arctic sea, about 180 miles northwest from the New Siberian islands.

2. The Greely relief expedition of 1884 reached the coast of Greenland in May; the *Bear* met the pack ice near Godhavn about May 13; the *Thetis* and *Loch Garry*, May 22; the *Alert* on

June 5. The latter left Godhavn June 9 and reached Upernivik June 13.

3. On June 18 some Eskimo found on the surface of an ice floe off Julianehaab, in southwest Greenland, some articles, which were turned over to the Danish officer in charge of that settlement, Herr Lytzen, who sent them to a friend in Copenhagen. These comprised, among other things, some broken biscuit boxes, a pair of oilskin trousers, said to have been marked Louis Noros (the name of one of the *Jeannette* survivors, who was a member of the Greely relief expedition of 1884), and a number of written papers, especially a list of the boats of the *Jeannette*, and a list of provisions signed by De Long, the commander of the *Jeannette* expedition, and stated to be entirely in his or a single handwriting.

4. The Greely relief expedition left Greenland from Godhavn July 9, without touching at Julianehaab.

5. In the latter part of the winter of 1884-'85 a Danish correspondent wrote to Dr Emil Bessels, formerly of the *Polaris* expedition and a well-known arctic expert, at Washington, stating that news of these various relics had been received in Copenhagen and requesting his opinion as to their authenticity. The substance of this letter was communicated to me by Dr Bessels, who was much interested in the find, as, if genuine, it obviously furnished important data toward a knowledge of the drift in the polar regions. The presence in Washington during 1885 of many members of the relief expedition, in connection with the various investigations which followed their return, enabled Dr Bessels to interview many of the seamen as well as their officers and to accumulate a large mass of notes from his examination of them. On one or two occasions I was invited to be present when some of these men called on Dr Bessels. The well-known tendency of articles on the surface of ice, under the influence of the sun, to sink through it to the level of the water—even such trifles as bird's feathers or dead leaves being rapidly engulfed, as I have often personally noticed—led to doubts as to the possibility of the articles mentioned having remained on the surface of the ice for three years during a drift of 3,000 miles, exposed to the elements. The possibility of the preservation of written papers under such conditions seemed almost incredible. The close approximation of the dates of the presence of the relief expedition on the west Greenland coast and that of the finding of the relics was also suspicious. The testimony of the seamen interviewed was, in

brief, to the effect that the presence of *Jeannette* survivors on the relief expedition had suggested to some one the possibility of producing a sensation in the fleet which for some time followed the foremost vessels; that in a spirit of boyish levity this hoax was conceived and carried out, with no intention of serious deception or thought of the possible consequences. No names were mentioned and the evidence was to the effect that a general impression prevailed among the men that some such prank had been played rather than that any particular man questioned was personally cognizant of the act. Dr Bessels gathered an amount of evidence tending to support this hypothesis, which he showed me and which covered forty or fifty pages of foolscap. This record was afterward burned, with his library and other papers, in a fire which destroyed his residence at Glendale, D. C. In consequence Dr Bessels communicated to his European correspondents his belief that the relics were fictitious and the result of a hoax. I stated to Dr Rink and others who inquired of me the same conclusions.

6. In 1888 Dr Nansen made his celebrated journey across Greenland and presumably heard of the relics there. Before his return, Dr Bessels died in Germany, where he had taken up his residence. Up to this time either the doubts which had been thrown on the authenticity of the relics, or some other reason, had prevented them from exciting much interest, and the owner seems to have resisted any attempt to verify their authenticity by sending photographs or originals of the papers to America when requested. The papers and other objects were placed in a box in a garret and, after the death of the owner, were burned as worthless, with the acquiescence of the widow. As Herr Lytzen had published an account of them (*Geogr. Tidskr.*, viii, 1885-'88, pp. 49-51) and the finder and possessor alike acted in perfect good faith throughout, it is probable that after Dr Bessels' opinion was communicated to him, the owner attached no great value to the objects, otherwise his wife could hardly have been ignorant of it.

When Dr Nansen endeavored to examine these objects with a view of determining their authenticity, they were no longer in existence.\* One of his friends, whose name has slipped my memory and whose letter is temporarily inaccessible, wrote to me on Nansen's behalf, as he explained, asking my opinion,

\* See Roy. Geog. Soc. Proc., Nov. 14, 1892, in *Geog. Journal*, Jan., 1893, pp. 1-32.

which was sent some time before the starting of Nansen's latest expedition. Baron Nordenskiöld was also informed some time before Nansen sailed, so that there is no doubt that Nansen was cognizant of the fact that the authenticity of the relics was seriously questioned. He had previously admitted as much in his paper above cited, but did not on that account relax his faith in them.

*Conclusions.*—It is evident that the proof that the relics were the result of a hoax is not complete, and, in the nature of things, unless the parties actually concerned shall admit it, is never likely to be completed. Each person will form his own opinion from the data submitted. I have spent some ten years of my life at sea, nearly half of the time in command of a United States surveying vessel, and I am quite aware of the nature of sailor men and sailors' evidence. Dr Bessels was for years my intimate and valued friend and associate, and in all our intercourse nothing ever occurred to lead me to doubt his earnest endeavor to get at the truth of this matter. My own conclusions are, first, that the relics were not authentic, and, second, that they were probably due to a hoax, as stated above. In support of the first conclusion, beside the data given, the probability that De Long himself would be writing out receipts for stores is very small. There has been since 1848 an average of two or three ships a year lost in the ice north of Bering strait, and in the vicinity of the point where the *Jeannette* entered the pack. Not a single relic of all the enormous fleet of over one hundred wrecks has ever been identified on the Greenland coast, where wood has always been of the greatest value. Driftwood from northern rivers is cast up on the Greenland coast more or less every year, but there is no evidence that it comes from points east of Nova Zembla. It is not impossible that some of it does, but it cannot be proved. Some twenty-odd years ago a throwing-stick, of the pattern used at Port Clarence, near Bering strait, came ashore on the coast of Greenland, near Godhaab, and was presented to the museum at Christiania by Dr Rink.\* When one remembers how the crews of whaleships collect curios which they carry to all parts of the world, and which are often thrown away or lost in the most unexpected places, the certainty that this stick drifted from Port Clarence, a distance of not less than 4,000 miles, is evidently not to be taken for granted. I have received from lagoons on the

\* Cf. Geog. Tidsskr., ix, No. 4, pp. 75-6, Copenhagen, 1887.

west side of the peninsula of Lower California, formerly frequented by whalers, marine shells unquestionably of north European origin, *Buccinum undatum* especially, which is not known in the Pacific at all, and I have also received Indo-Pacific species, as well as cocoanut shells, collected by John Murdoch, from the shores of the Arctic ocean, north of Bering strait. That the drift of the *Jeannette* was due to the prevalent winds is beyond question, as already shown by Melville, and as may be worked out by anybody from the data. That, if continued, it would have passed across the Pole, as argued by Nansen, is a pure assumption, though a very enticing one. Certainly no one interested in arctic work but must most heartily wish that that courageous explorer may succeed in proving his hypothesis and return in safety to claim the laurels his success would earn.

In regard to the second point, that of the origin of the so-called relics, if regarded as fictitious, I have already stated my conclusion that the story of the hoax seems sufficient to account for them. To be perfectly impartial, however, one must admit that the currents about southwest Greenland are such that objects set adrift on the ice from any great distance to the northward of Julianehaab would usually be set over to the westward rather than in shore, although this general rule is subject to exceptions, due to strong westerly winds. This fact alone I suspect was sufficient to satisfy Nansen, whose hypothesis was already framed; but it must be remembered that the Greenland current does not round cape Farewell with equal strength at all seasons of the year; that the advent of the relief expedition was exceptionally early; the influx into Baffin's bay had not begun, and that along such a coast as that of Greenland eddies and reverse currents cannot fail to occur. While not without weight, I cannot assign to Nansen's objection sufficient weight to overcome the other indications, which for me, at least, lead to the conclusion that the so-called *Jeannette* relics have not been shown to have any certain connection with the *Jeannette* expedition. Furthermore, there is no certainty that the Alaskan throwing-stick was brought to the coast of Greenland by oceanic currents, and even if it was, the time occupied in the transit and the route are alike absolutely unknown, so that speculations as to a drift across the region of the Pole receive from this incident no positive confirmation.

Admiral Sir E. Inglefield, the distinguished Arctic traveler, at the meeting of the Royal Geographical Society called to discuss

Nansen's plans, told of finding a fresh stick of Siberian pine, with the bark still upon it and which seemed to have been only a few months in the water, on the west shore of Wellington channel, which enters Baffin's bay from the west.\* If such a tree could be carried eastward in a few months from Siberia to a point accessible by ships from Baffin's bay, why is it not more probable that this throwing-stick, lost near Port Clarence, was carried north and east by the well-known northeasterly shore current past point Barrow and so on to Baffin's bay and the Greenland coast?

At this meeting such Arctic authorities as Admiral Sir George Nares, Captain Wharton, Hydrographer R. N., ex-Hydrographer Sir George Richards, R. N., and Sir Joseph Hooker united in the opinion that nothing was known about the direction or existence of sea currents in the region Nansen hoped to traverse, and that all opinions in regard to them must be purely speculative. The doubtful character of the so-called *Jeannette* relics was also distinctly pointed out.† It cannot be said therefore that Nansen pursued his plans in ignorance of the doubtful elements of his hypothesis, but rather that his courage, energy, and audacity were such that he was willing to risk everything to put his speculations to a final test.

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## NANSEN'S POLAR EXPEDITION

By GENERAL A. W. GREELY,

*Chief Signal Officer, United States Army*

The continuing interest of the unsolved polar mystery has been strikingly illustrated by the eagerness with which the press of the world has caught at every word that seems to indicate the success and safety of the brave Norwegian in his dangerous drift-voyage toward the north pole.

Dr Fridtjof Nansen, born in 1861, became famous by crossing, first of all men, the inland ice of Greenland in 1888 from Umivik, 64° 45' north, on the east coast, to Kangarsunek fiord, 50 miles south of Godthaab. Later, he conceived a novel and dangerous plan for polar work. Ignoring the accepted rules of

\* *Geographical Journal*, Jan., 1893, p. 25.

† *Op. cit.*, pp. 22-32.



DR FRIDTJOF NANSEN





ice navigation—of avoiding besetment and following the protected lee of land-masses—he decided to put his ship into the ice to the north of the New Siberian islands, whence he believed that he would be carried by ocean currents across the pole to the Spitzbergen sea. His steamer, *Fram*, 125 feet long, with an oak hull 30 inches thick and sheathed with greenheart, was built so as to rise under ice pressure, as he claimed. The crew of twelve were provisioned for five years, though he expected, by a drift of a little over two miles per day, to reach the Atlantic in two years. No explorer of experience endorsed the plan, but with undaunted courage Nansen sailed June 24, 1893, and entering the sea of Kara was last seen to the east of Nova Zembla in September, 1893. He visited neither the Taimur peninsula nor the New Siberian islands, as events have since shown.

February 13, 1896, a dispatch from Irkutsk, on the authority of Konchnareff, an agent of Nansen, stated that the explorer, having reached land-masses at the North Pole, was now returning. Two days later a dispatch from Archangel confirmed the first report in general terms only. From the beginning no credit was given to these dispatches by any American arctic explorer or student. Melville, Schutze, Dall, and the writer were strenuous in disbelief, but the story was credited by scores of persons, both in Europe and this country, who did not find it peculiar that a story from the center of Asia was confirmed from the north of Europe, nor were surprised that such news came from the Siberian ocean in midwinter. Through the Norwegian press Nansen's relatives announce their disbelief in this rumor.

As to the drift-relics found on the west coast of Greenland, which were relied on by Nansen as practical proof that his theory of a drift voyage was correct, it may be said that Melville, the man best qualified to speak about the *Jeannette*, denied at the time their genuineness and endeavored without avail to have them brought to this country. The writer publicly called Nansen's attention to this question, which for the first time seems to have created doubts in his mind. Nansen made efforts to find the relics for verification, but they had disappeared *in toto*.

While Nansen's journey is exceedingly dangerous, it would not be astonishing if he was able to return from his ship, if it was lost south of 81° north, to the Asiatic coast, but if he really approached the North Pole, as is possible, before his vessel was destroyed, it is safe to say that he will pay for an unequaled

latitude with his life and carry the secret of his well-earned success to his grave.

The numerous errors lately set forth in the press indicate the need of accurate data relative to latitudes attained.

The tendency to unfairly present data in the interests of individuals or nations is of constant occurrence, and it is not surprising that the general public should be unfamiliar with all the facts. This is especially true in Arctic matters, as is shown by the North Polar chart in "The Times Atlas," 1895, so much lauded for its fullness and accuracy. On this chart the highest north of the German, Swedish, and English (Parry's, 1827) expeditions is so described in full by text and latitudes. In the case of Beaumont, the English explorer, his latitude is given as  $82^{\circ} 54'$  north, which is 33 miles too far north, and his record is spread on the map above that of Lockwood, while the last-named explorer, who actually made the highest north ever attained, has not even his latitude entered. In this remarkable case of *suppressio veri* an American explorer loses his nationality, his latitude, and his hard-earned record, all other nationalities having their data entered in full.

Under these conditions it seems to be rendering a geographical service to reproduce here a table extracted from a "Handbook of Arctic Discovery," written by myself.

*Records of the Highest North made since 1587 in the Eastern and Western Hemispheres by Land and by Sea.\**

EASTERN HEMISPHERE.

Commander.	Date.	N. lat.	Long.	Locality.
William Barents ..	July 14, 1594	$77^{\circ} 20'$	$62^{\circ}$ E.	Near cape Nassau, N. Z.
Ryp and Heemskerck (Barents' third voyage).	June 19, 1596	$79^{\circ} 49'$	$12^{\circ}$ E.	N. Spitzbergen.
Henry Hudson....	July 13, 1697	$80^{\circ} 23'$	$10^{\circ}$ E.	Spitzbergen sea.
J. C. Phipps .....	July 27, 1773	$80^{\circ} 48'$	$20^{\circ}$ E.	" "
William Scoresby..	May 24, 1806	$81^{\circ} 30'$	$19^{\circ}$ E.	" "
W. E. Parry .....	July 23, 1827	$82^{\circ} 45'$	$20^{\circ}$ E.	" "
Nordenskiöld and Otter.	Sept. 19, 1868	$81^{\circ} 42'$	$18^{\circ}$ E.	Spitzbergen sea, highest by ship.
Weyprecht and Payer.	April 12, 1874	$82^{\circ} 05'$	$60^{\circ}$ E.	Franz Josef Land, by Payer, highest land.

\* NOTE.—This table is reproduced by permission of Roberts Brothers, Publishers.

## WESTERN HEMISPHERE.

Commander.	Date.	N. lat.	Long.	Locality.
John Davis.....	June 30, 1587	72° 12'	56° W.	W. Greenland.
Henry Hudson....	June 20, 1607	73°	20° W.	Off E. Greenland.
William Baffin....	July 4, 1616	77° 45'	72° W.	Smith sound.
E. A. Inglefield....	Aug. 27, 1852	78° 21'	74° W.	Smith sound.
E. K. Kane.....	June 24, 1854	80° 10'	67° W.	Cape Constitution, Greenland, by Morton.
C. F. Hall .....	Aug. 30, 1870	82° 11'	61° W.	Frozen sea.
C. F. Hall .....	June 30, 1871	82° 07'	59° W.	Greenland, by Ser- geant Meyer, Sig- nal Corps, U. S. Army.
G. S. Nares.....	Sept. 25, 1875	82° 48'	65° W.	Grinnell Land, by Aldrich.
G. S. Nares.....	May 12, 1876	83° 20'	65° W.	Frozen sea, by A. H. Markham.
A. W. Greely .....	May 13, 1882	83° 24'	41° W.	New Land, north of Greenland, by Lockwood and Brainard.

Doubtless the name of some whaler should follow that of Baffin in the above list, but the inexactitude of most high latitudes reported by whalers is well known. Possibly the reported northing of Lambert, 78½ degrees north, in 1670, on the east Greenland coast, may have exceeded Inglefield's exact latitude of 78° 21'.

Sweden holds the *ship's* record in the old world, but Parry beat it by *boats*. It will be noted that England held the honors of the farthest north through Hudson, 1607; Phipps, 1773; Parry, 1827, and Nares, by Aldrich, 1875, and by Markham, 1876. This record, unbroken for 275 years, passed to the United States through the efforts of the International Polar Expedition, under Lieutenant Greely, which, by Lockwood and Brainard, reached 83° 24', the most northerly point, whether on sea or land, ever attained by man, which Nansen or Jackson may possibly excel.

Among other high latitudes attained, but not pertinent to this table, are the following: Hayes, about 80° 10', in 1861; Jackson, 81° 20', in 1895; Peary, 81° 37', in 1891 and 1895; Beaumont, 82° 21', in 1876; Pavey (with Greely), 82° 54', in 1882, and Aldrich, 83° 07', in 1876.

## THE SUBMARINE CABLES OF THE WORLD

BY GUSTAVE HERRLE

The English give Professor (afterward Sir) Charles Wheatstone the credit of being the originator of submarine cables, that gentleman having laid before the House of Commons in 1840 a scheme for the laying of a telegraph cable across the channel between Dover and Calais, but his plans do not seem to have been fully matured.

In the United States, in 1842, Professor S. F. B. Morse experimented with a submarine cable between Castle Garden and Governor's island, New York harbor, and a year later, in detailing the results of his experiments with an electro-magnetic telegraph in a letter to the then Secretary of the Treasury, J. C. Spencer, he said :

. . . "The practical inference from this law is that a telegraphic communication on the electro-magnetic plan may with certainty be established across the Atlantic. Startling as this may seem now, I am confident the time will come when this project will be realized." . . .

It was not, however, until 1850 that the first submarine cable in the open sea was laid. This was the cable across the channel between Dover and Calais. It was made of copper wire, covered with gutta-percha to half an inch in diameter, the shore ends of the wire being doubly covered with cotton, overlaid with a coating of India rubber, and the whole inclosed in a thick lead pipe. This cable did not work successfully, on account of defective insulation, and had to be abandoned. Another authority states that telegraphic communication was maintained for a few hours, when it was suddenly interrupted, the cause being, as was afterwards discovered, the cutting of the cable by a French fisherman, who, it is said, exhibited a piece of it to the astonished people of a neighboring town as a rare specimen of sea-weed with its center filled with gold. Be that as it may, to guard against such casualties the new cable, laid in the following year (1851), between Dover and Calais, was made much stronger, consisting of a wire insulated with gutta-percha and forming a core to a wire rope as a protector. This cable was an entire success, and,

as a consequence, the establishment of a number of short submarine cables in Europe and America followed shortly afterward.

In 1854, Mr Cyrus W. Field, whose memory will ever be dear to the hearts of Americans, took up, in company with American and English capitalists, the project to connect Europe and America by a submarine cable, and on August 7, 1857, the laying of the first Atlantic cable was begun by the U. S. frigate *Niagara*, which sailed from Valentia, Ireland, in the direction of Heart's Content, Newfoundland. When about 400 miles had been laid, the cable broke and the steamer returned. In the following year, 1858, the attempt was renewed, H. M. S. *Agamemnon*, with one portion of the cable, and the U. S. frigate *Niagara*, with the other portion, meeting in mid-ocean, in about latitude  $52^{\circ} 02'$  north, longitude  $33^{\circ} 18'$  west, to splice the cable there, and then to lay it, one ship sailing eastward and the other westward. In this attempt also the cable broke and the steamers returned to port, but a sufficient length of cable being left, another attempt was made later in the year and the laying was successfully accomplished over the whole distance. America and Europe were united by telegraphic communication on August 5, and congratulatory messages were exchanged between the two continents. This is what the Queen of England telegraphed to the President of the United States :

"The Queen desires to congratulate the President upon the successful completion of this great international work, in which the Queen has taken the deepest interest. The Queen is convinced that the President will join with her in fervently hoping that the electric cable which now connects Great Britain with the United States will prove an additional link between the nations whose friendship is founded upon their common interest and reciprocal esteem. The Queen has much pleasure in communicating with the President, and renewing to him her wishes for the prosperity of the United States."

To this President Buchanan replied as follows :

"The President cordially reciprocates the congratulations of Her Majesty the Queen on the success of the great international enterprise accomplished by the science, skill, and indomitable energy of the two countries. It is a triumph more glorious, because far more useful to mankind, than was ever won by conqueror on the field of battle. May the Atlantic telegraph, under the blessing of Heaven, prove to be a bond of perpetual peace and friendship between the kindred nations, and an instrument destined by Divine Providence to diffuse religion, civilization, liberty, and law throughout the world. In this view will not all nations of Christendom spontaneously unite in the declaration that it shall be forever neutral, and that its communications shall be held sacred in passing to their places of destination, even in the midst of hostilities ?"

But, alas, the joy over the greatest triumph of the age was destined to be of short duration. In less than a month the cable refused to work, owing to some fault the nature of which could not be definitely ascertained. It was at last abandoned in despair, and no further attempt to lay another one was made until 1864, when the Atlantic Telegraph Company made with the Telegraph Construction and Maintenance Company a contract for a new cable between Valentia and Heart's Content and chartered the steamship *Great Eastern* to lay it. This cable was 2,273 nautical miles\* long, and its weight was 300 pounds per mile. Its laying down commenced on July 23, 1865, Mr Cyrus W. Field being on board the ship, but on August 2, after about 1,400 knots had been paid out, the cable parted and the broken end disappeared from view. The *Great Eastern* remained near the scene of the accident until August 11, when she gave up the attempt to recover the cable and returned to Europe. Thus another hope, another aspiration, was buried, and we may well imagine the feelings of those who had put their faith and their money into the undertaking.

The story of this attempt and of the successful recovery of the lost cable a year later by means of grapnels from a depth of over 2,000 fathoms forms one of the most interesting chapters in the history of submarine telegraphy; but after all the disheartening failures which had attended the laying of the first three Atlantic cables, the indomitable pluck and energy of Mr Field and his associates were to be finally rewarded with success. A new cable was ordered, and on July 13, 1866, the *Great Eastern* again started from Valentia and, without further serious mishap, finished the laying over the whole distance on July 27, when the cable was spliced to the shore end at Heart's Content. Moreover, on September 1 following, the *Great Eastern* recovered the lost cable of the previous year, spliced it to the cable on board, and completed the laying of it toward Heart's Content, thus establishing a duplicate line. Ever since that time we have had uninterrupted telegraphic connection with Europe, and this 1866 cable thus became the pioneer of the long-distance, deep-sea cables.

Immense progress has since been made in the establishment of submarine telegraph lines. A fleet of between thirty-five and forty steamers, specially constructed and equipped for cable

\*A nautical mile, as defined by the United States Coast and Geodetic Survey, equals 6,080.27 feet, or 1.1516 statute miles.



service, sprang into existence, and the present total length of the submarine cables of the world is, in round numbers, 160,000 nautical miles, or enough to girdle the earth seven and one-half times at the equator. At an average cost of \$1,200 per mile, the entire system represents an outlay of \$192,000,000. Of the total mileage about one-eighth is under the control of various national governments.

The Hydrographic Office issued, in 1892, a book on "Submarine Cables," prepared by Mr G. W. Littlehales as a part of the report of that Office on the survey made by the U. S. ships *Albatross* and *Thetis* for an ocean cable route between San Francisco and Honolulu. It contains a large amount of interesting information, including valuable statistical data, among which is a complete list of the Submarine Cables of the world, in detail. The tables being much too voluminous for publication in these pages, the following list of the more important cables has been compiled from them, the reader being referred to the original report for information concerning the shorter cables and for more complete data generally :

CABLES OVER FOUR HUNDRED NAUTICAL MILES LONG, OPERATED  
BY GOVERNMENTS.

France : Marseilles to Algiers, 3 cables, 488, 496, and 500 ; Teneriffe to St. Louis, Senegal, 865.

Cochin China and Tonkin : Cape St. James to Thuan-An (Hué), 530.

British India : Manora to Jask, 531 ; Jask to Bushire, 2 cables, 519 and 500.

CABLES OVER FOUR HUNDRED NAUTICAL MILES LONG, OWNED BY  
PRIVATE COMPANIES ; ALSO TOTAL LENGTH OF CABLES OPERATED  
BY EACH COMPANY.

Direct Spanish Telegraph Company, total, 708 : Kennack Cove, Cornwall, to Las Arenas, near Bilbao, 487.

Halifax and Bermuda Cable Company : Halifax, N. S., to Hamilton, Bermuda, 850.

Spanish National Submarine Telegraph Company, total, 2,159 : Cadiz to Santa Cruz de Teneriffe, 864 ; Tejita, Teneriffe, to St. Louis, Senegal, 865.

West African Telegraph Company, total, 3,015 : Kotonu to St. Thomas, 486 ; St. Thomas to Loanda, 760.

Great Northern Telegraph Company, Europe and Asia, total, 6,932 ; Newbiggin, England, to Arendal, Norway, 424 ; Newbiggin to Marstrand, Sweden, 510 ; Newbiggin to Hirtshals, Denmark, 420 ; Amoy to Gutzlaff, China, 590 ; Gutzlaff to Nagasaki, Japan, 427 ; Gutzlaff to Nagasaki, 416 ; Nagasaki to Vladivostock, Russia, 2 cables, 753 and 766.

Eastern Telegraph Company, total, 27,453: Porthcurno, Land's End, England, to Lisbon, Portugal, 2 cables, 850 and 892; Porthcurno to Vigo, Spain, 622; Gibraltar to Malta, 2 cables, 1,118 and 1,126; Marseilles, France, to Bona, Algeria, 2 cables, 447 and 463; Trieste, Austria, to Corfu, 503; Malta to Alexandria, Egypt, 2 cables, 928 and 911; Suez, Egypt, to Suakim, Soudan, 3 cables, 936, 811, and 811; Suez to Aden, 794; Suez to Perim Island, 1,331; Suakim to Perim Island, 597; Suakim to Aden, 2 cables, 794 each; Aden to Bombay, 3 cables, 1,850, 1,859, and 1,885.

Eastern and South African Telegraph Company, total, 6,796 (increased since 1892 to 8,841): Aden to Zanzibar, 1,909; Zanzibar to Mozambique, 2 cables, 644 and 686; Mozambique to Lourenço-Marques, Delagoa bay, 970; Cape Town to Port Nolloth, 433; Port Nolloth to Mossamedes, 1,052.

Eastern extension, Australasia, and China Telegraph Company, total, 17,342: Madras to Penang, 2 cables, 1,462 and 1,389; Rangoon to Penang, 864; Singapore to Saigon, Cochin China, 628; Haiphong, Tonkin, to Hongkong, 470; Fuchau to Hongkong, 472; Saigon to Hongkong, 990; Saigon to Thuan-An, 516; Hongkong to cape Bolinao, island of Luzon, 529; Singapore to Batavia, Java, 541; Singapore to Banjuwangi, Java, 921; Banjuwangi to Port Darwin, Australia, 2 cables, 1,143 and 1,124; Banjuwangi to Roebuck bay, Australia, 892; Sydney to Nelson, New Zealand, 2 cables, 1,284 and 1,322; Hongkong to Fuchau, 472; Fuchau to Shanghai, 449.

Anglo-American Telegraph Company, total, 10,400 (increased to 12,290 since 1892): Valentia, Ireland, to Heart's Content, Newfoundland, 3 cables, 1,846, 1,881, and 1,890; Minou, France, to St. Pierre, 2,718; St. Pierre to Duxbury, Massachusetts, 809.

Direct United States Cable Company, total, 3,099: Ballinskelligs bay, Ireland, to Halifax, 2,564; Halifax to Rye Beach, New Hampshire, 535.

Compagnie Française du Télégraphe de Paris à New York, total, 3,496: Brest to St. Pierre, 2,282; St. Pierre to Cape Cod, Massachusetts, 828.

Western Union Telegraph Company, total, 7,743: Penzance, England, to Canso, Nova Scotia, 2 cables, 2,531 and 2,576; Canso to New York, 2 cables, each 888.

The Commercial Cable Company, total, 6,938 (since increased to 9,075): Havre to Waterville, Ireland, 510; Waterville to Canso, 3 cables, 2,138, 2,350, and 2,388; Canso to New York, 841; Canso to Rockport, Massachusetts, 519.

Brazilian Submarine Telegraph Company, total, 7,369: Lisbon to Madeira, 2 cables, 627 and 631; Madeira to St. Vincent, Cape Verde island, 2 cables, 1,168 and 1,209; St. Vincent to Pernambuco, Brazil, 2 cables, 1,862 and 1,872.

African Direct Telegraph Company, total, 2,746: Santiago to Bathurst, 471; Bathurst to Sierra Leone, 463; Sierra Leone to Akkra, 1,020.

Cuba Submarine Telegraph Company, total, 1,500: Cienfuegos to Santiago, Cuba, 3 cables, 400, 420, and 420.

West India and Panama Telegraph Company, total, 4,557: Kingston, Jamaica, to Colon, Panama isthmus, 630; Holland bay to San Juan, Porto Rico, 683; Holland bay to Ponce, Porto Rico, 647; St. Croix to Port of Spain, Trinidad, 541.

Société Française Des Télégraphes Sous-Marins, total, 3,754 (since increased to 4,544): Porto-Plata, Santo Domingo, to Fort de France, Martinique, 787; Fort de France to Paramaribo, Dutch Guiana, 777; Cayenne to Vizeu, Brazil, 662; Santo Domingo to Curaçao, 453.

Western and Brazilian Telegraph Company, total, 3,964 (since increased to 6,144): Maranhão to Ceara, Brazil, 406; Ceara to Pernambuco, 476; Bahia to Rio de Janeiro, 837.

Mexican Telegraph Company, total, 1,523: Galveston, Texas, to Tampico, Mexico, 490; Galveston to Coatzacoalcas, Mexico, 822.

Central and South American Telegraph Company, total, 7,497: Salina Cruz, Mexico, to Libertad, Salvador, 434; San Juan del Sur to Panama, 721; Buenaventura to St. Elena, Ecuador, 486; Paita to Callao-Lima, Peru, 553; Callao-Lima to Iquique, Chile, 747; Iquique to Valparaíso, Chile, 877.

West Coast of America Telegraph Company, total, 1,699 (since increased to 1,964): Callao-Lima to Mollendo, Peru, 510.

#### NOTE ON COMPILATION OF CHART.

This chart (see frontispiece) was compiled in the U. S. Hydrographic Office from the latest information, and is a facsimile of H. O. chart \* No. 1530, just issued by that Office.

The twelve cables across the North Atlantic ocean were plotted, from their terminal points on the American continent to meridian 40° west, from positions furnished by the respective cable companies, with the exception of three—the Western Union of 1881 and 1882 and the Mackay-Bennett of 1894—for which positions were furnished all the way across. From the European terminal points to meridian 40° west, the cables, with the exceptions just mentioned, were plotted from information deposited in the Office of Naval Intelligence.

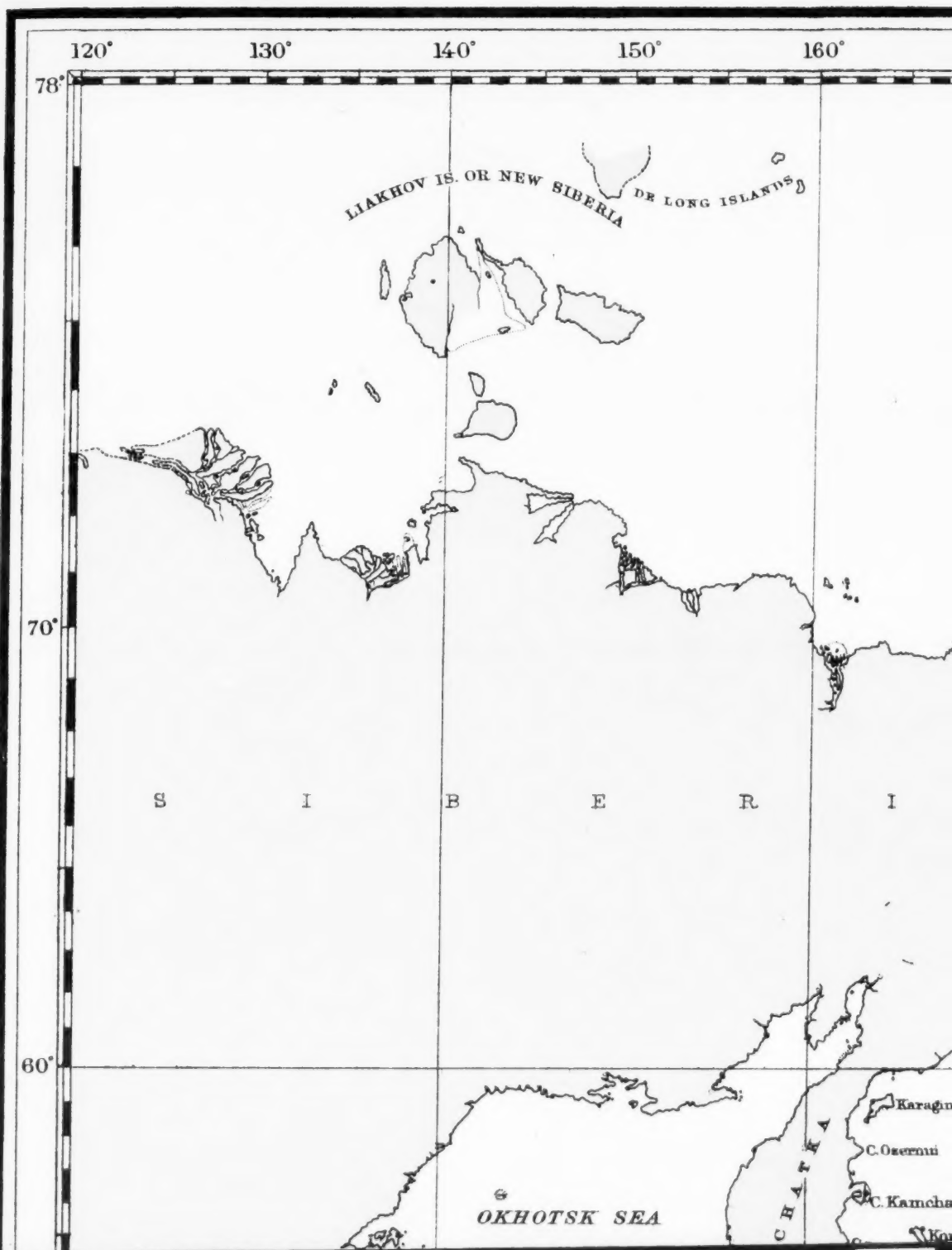
A map furnished by the Western Union Telegraph Company was used for the plotting of the principal connecting land lines in the United States.

The cables and land lines of Japan were taken chiefly from the Outline Map of Japan showing the principal Post, Telegraph, and Railway Routes, published by the Japanese Department of Communications in 1888, and which accompanies "A concise Dictionary of the principal Roads and Chief Towns and Villages of Japan," by W. N. Whitney, M. D., formerly Interpreter at the U. S. Legation at Tokyo.

The other cables and land lines of the World were taken chiefly from the "Carte des Communications Télégraphiques du Régime Extra-Européen dressée d'après des documents officiels par Le Bureau International des Administrations Télégraphiques," Berne, 1888.

The Coaling, Docking, and Repairing Stations of the World and their different grades of facilities were compiled mainly from a publication of the Office of Naval Intelligence, entitled "Coaling, Docking, and Repairing Facilities of the Ports of the World," 1892, and corrections thereto up to December, 1895, and from the British Dock book of 1894.

\* This chart is sold by the Hydrographic Office and its agents at 50 cents per copy.





170° 160° 150° 140° 130°



# SUBM WITH COALING, I





# SUBMARINE CABLES

WITH THE PRINCIPAL CONTINENTS

ALSO

## COALING, DOCKING, AND



# MAPS OF THE WORLD

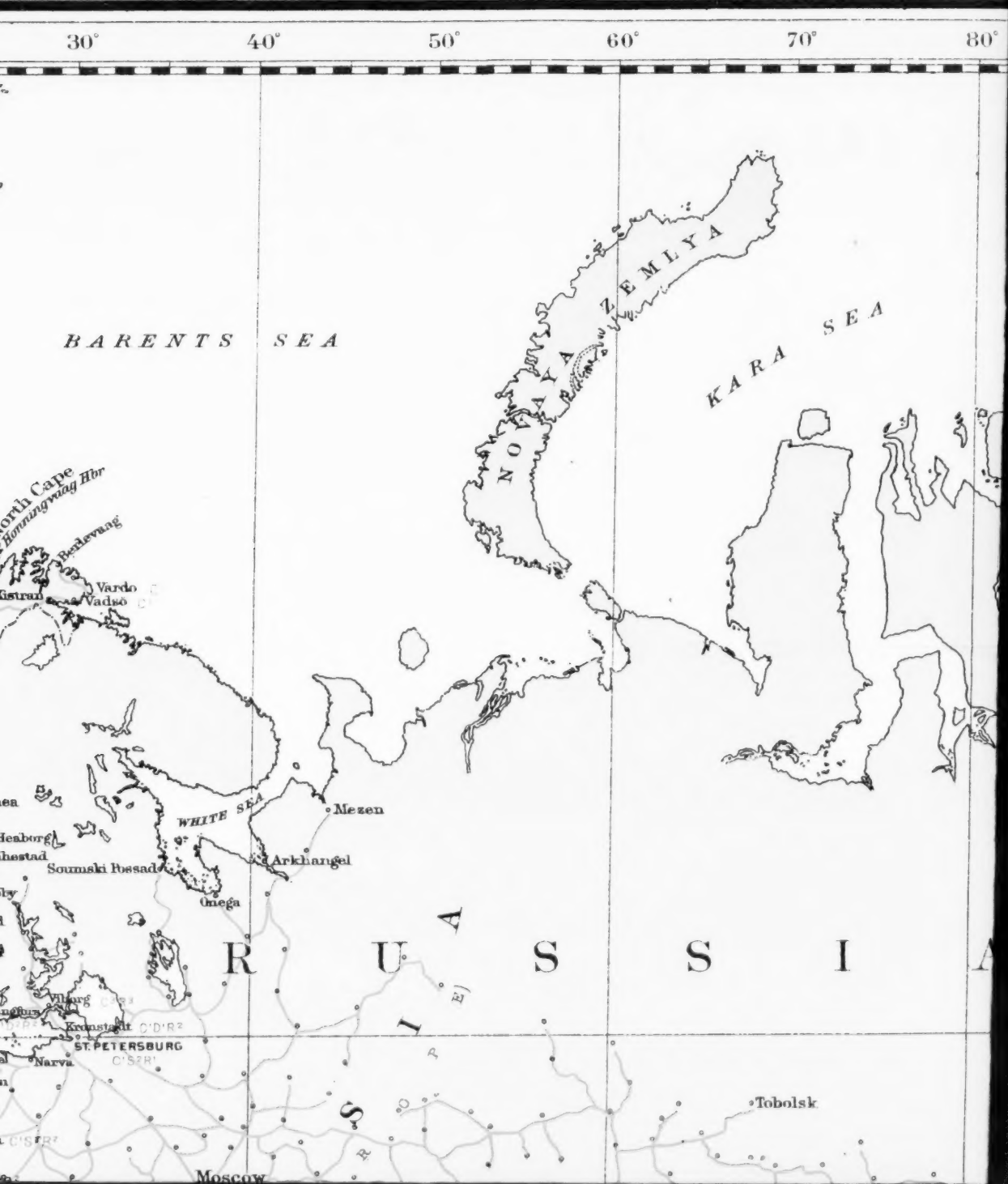
## CONNECTING LAND LINES

### AND REPAIRING STATIONS



# HIRING STATIONS







90° 100° 110° 120° 130° 140°



60°

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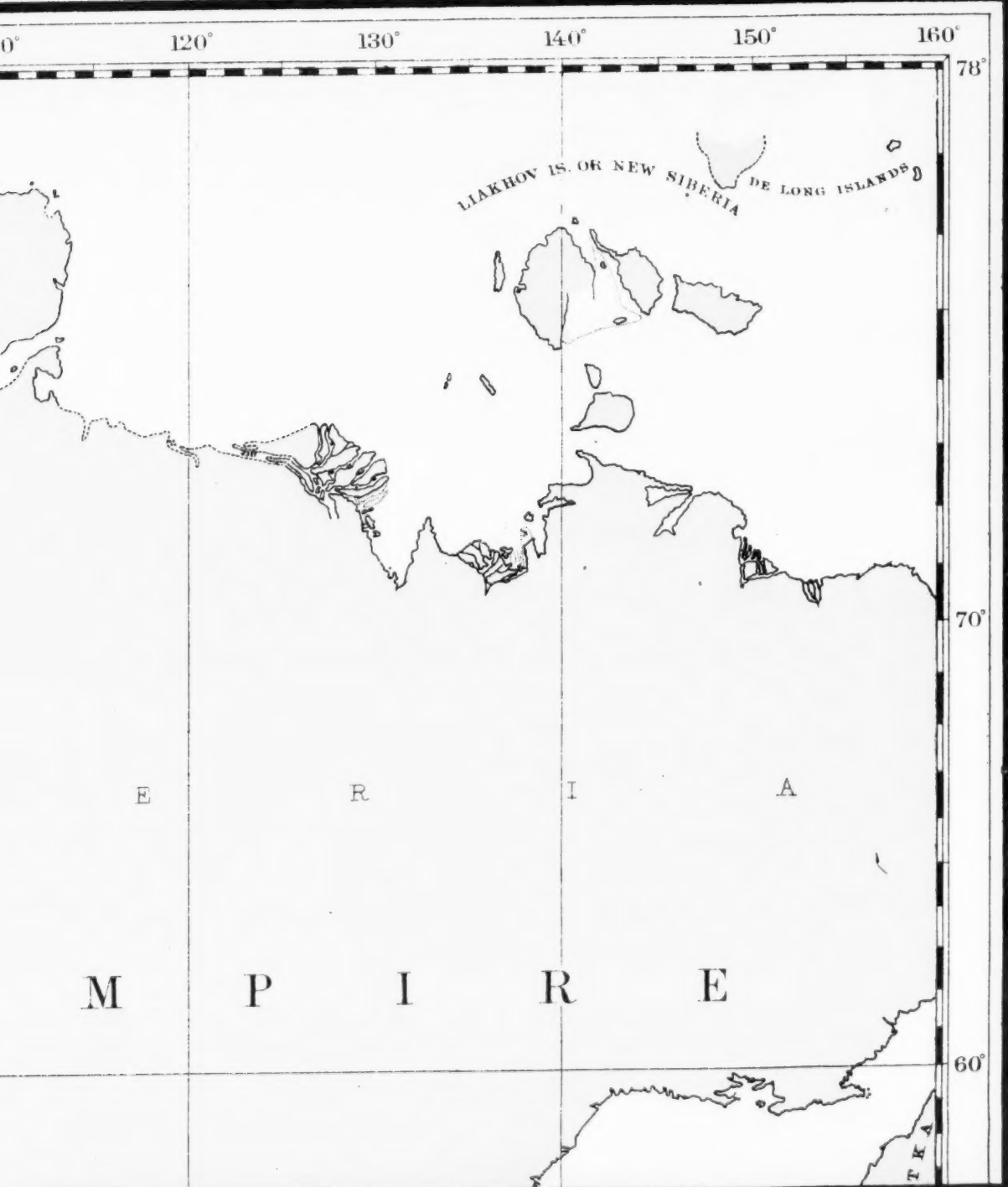
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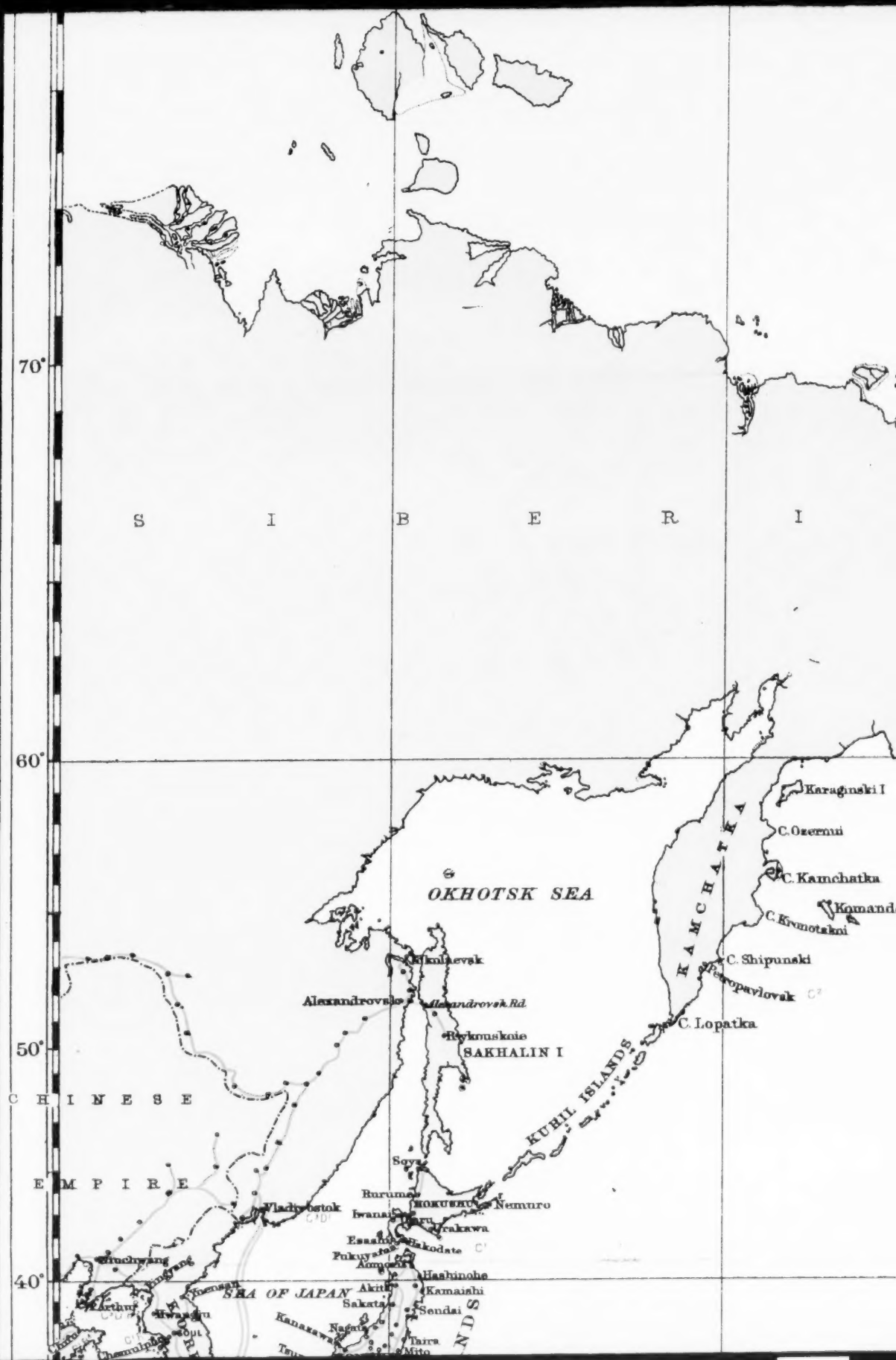
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 Montreal  
 Quebec  
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 Philadelphia  
 Baltimore  
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 New York  
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 Hartford  
 Springfield  
 Cincinnati  
 St. Louis  
 Kansas City  
 Omaha  
 Lincoln  
 St. Paul  
 Minneapolis  
 St. Cloud  
 Fargo  
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 Bismarck  
 Helena  
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 Great Falls  
 Missoula  
 Kalispell  
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**Volume 1**

© 2003 D.P. Denton

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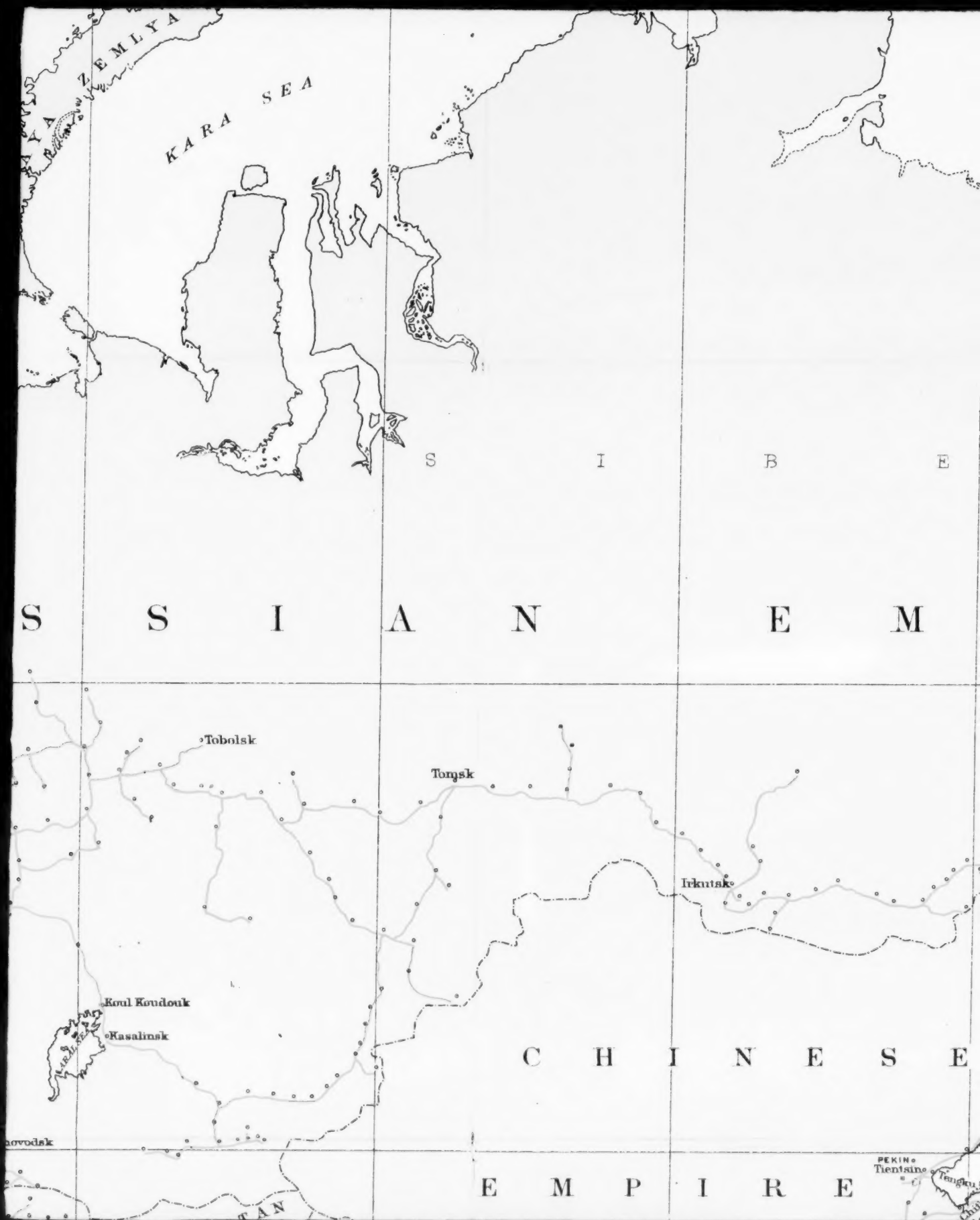
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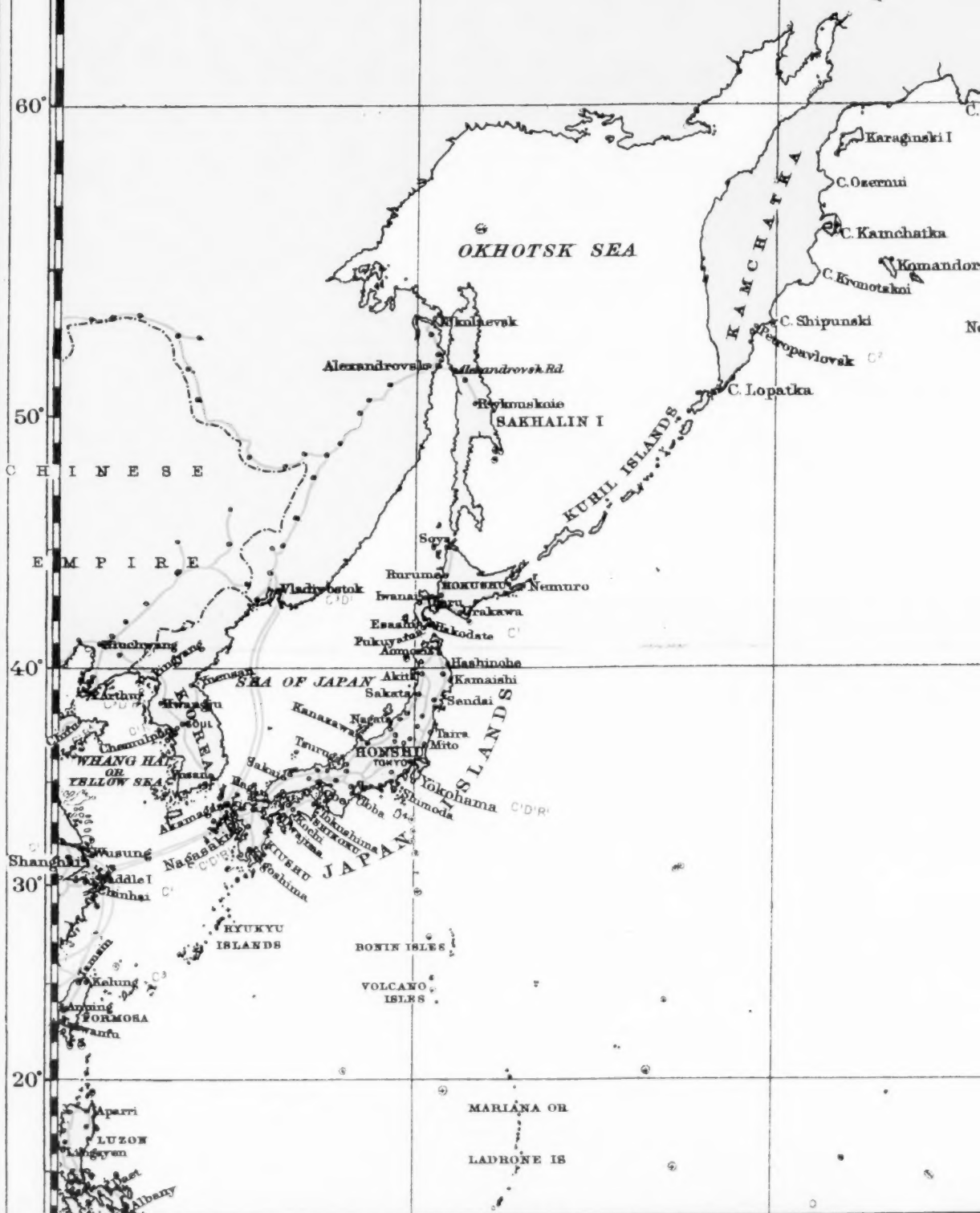






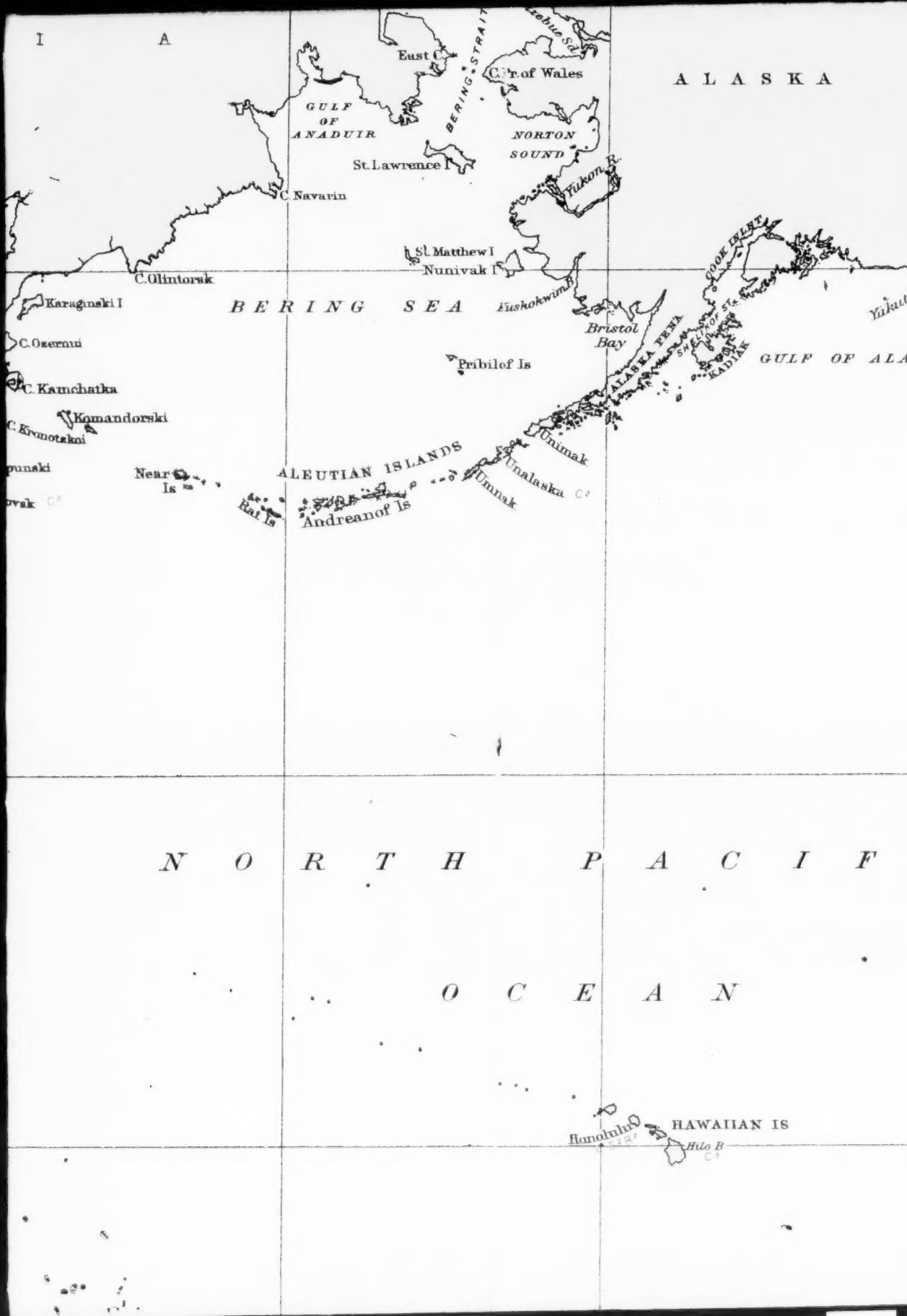


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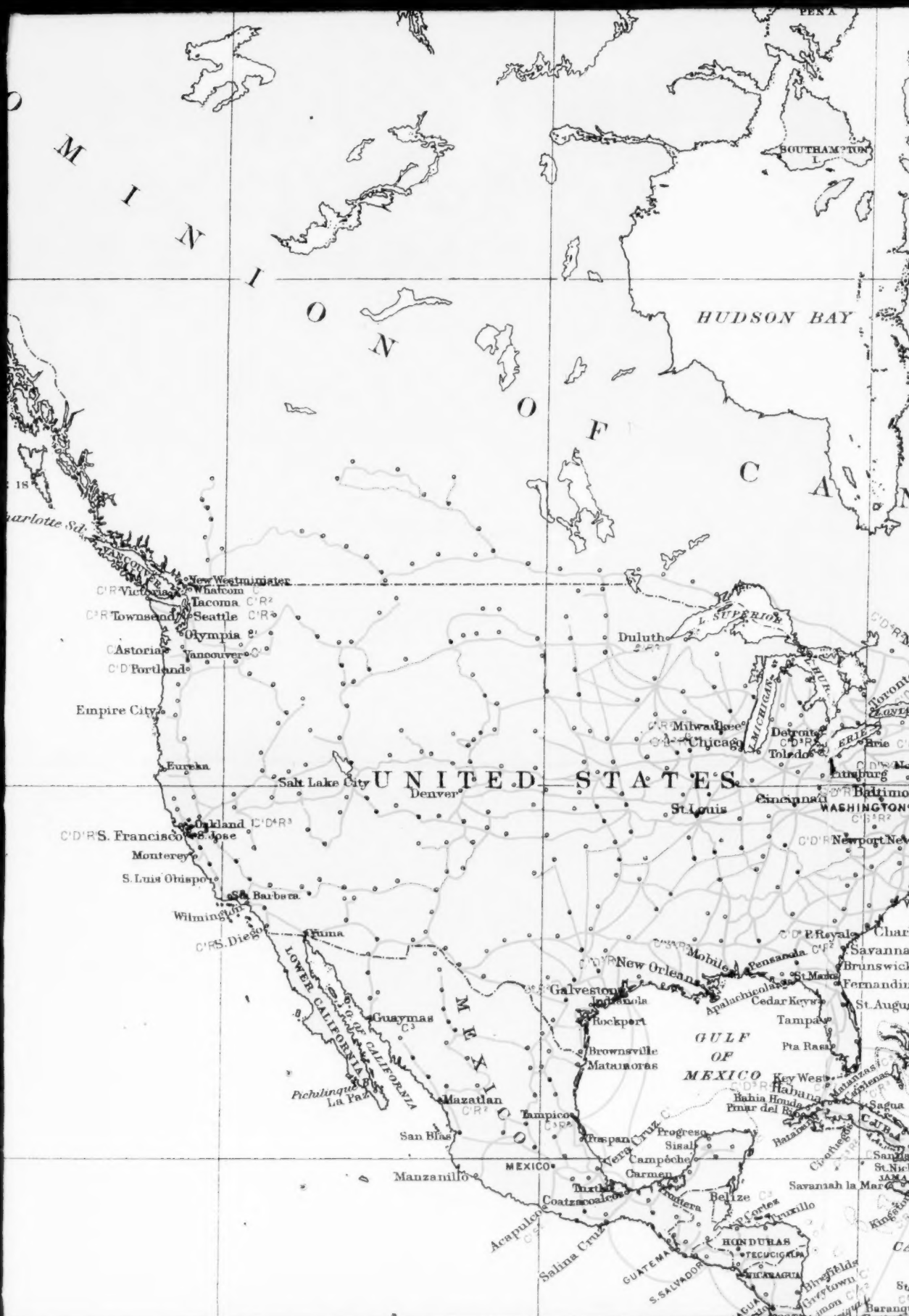


























R U S S I A N

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BRITISH INDIA

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ARABIAN SEA

BAY OF  
BENGAL

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Tomsk

Koul Kondouk

Kawalinsk

Astrakhan

Bakou

Krasnovodak

Recht  
Barfrouch  
TEHERAN

Bushire

Maskate

Chahbar  
Gwadar  
Pasni  
Ormara  
Sunnayam  
Karachi

Bhatnagar

Bombay

Vengurla  
Goa  
Kumple

Mangdore

Berhampur

Chicacole  
Vizagapatam

Cocanada

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Pondicherry

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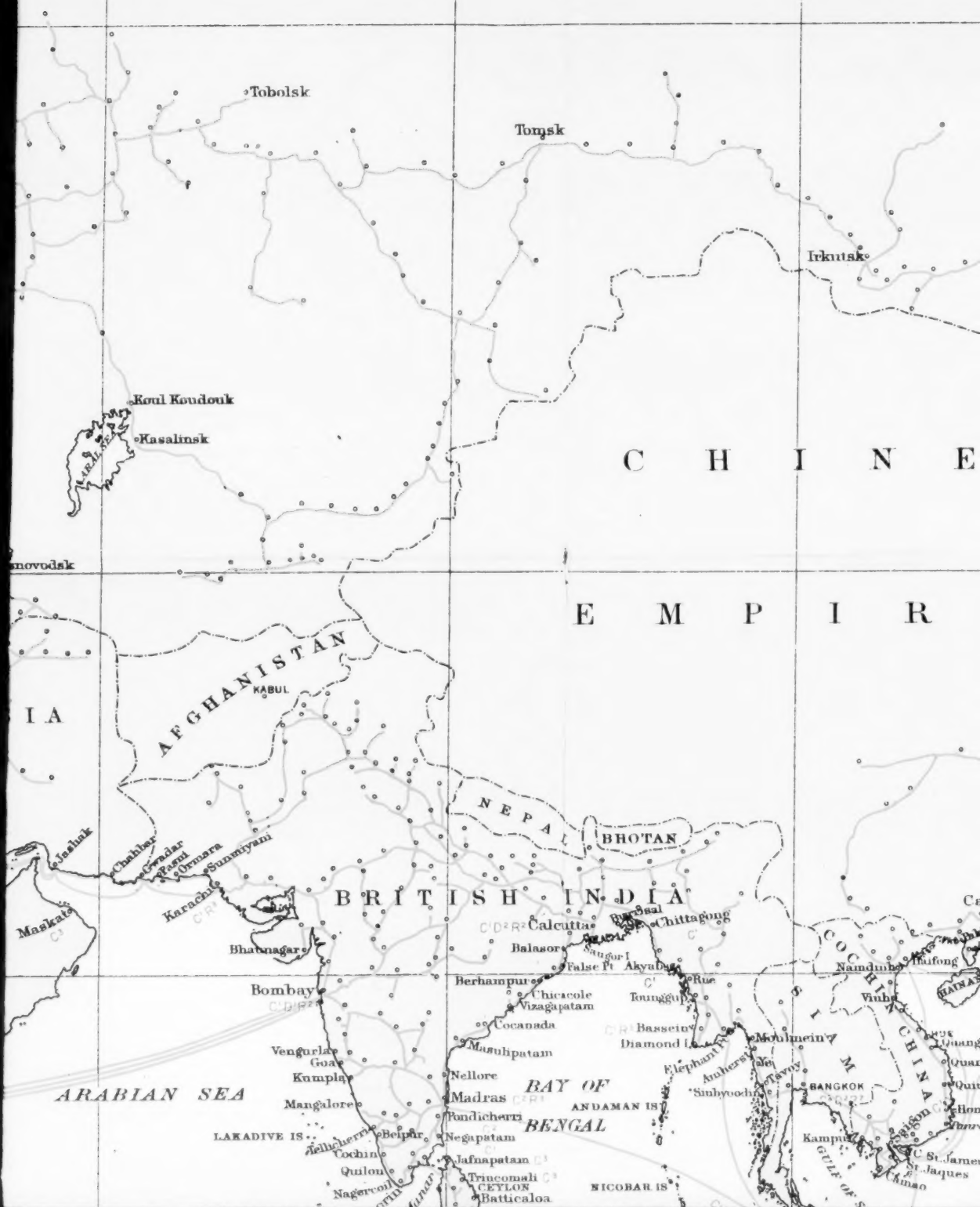
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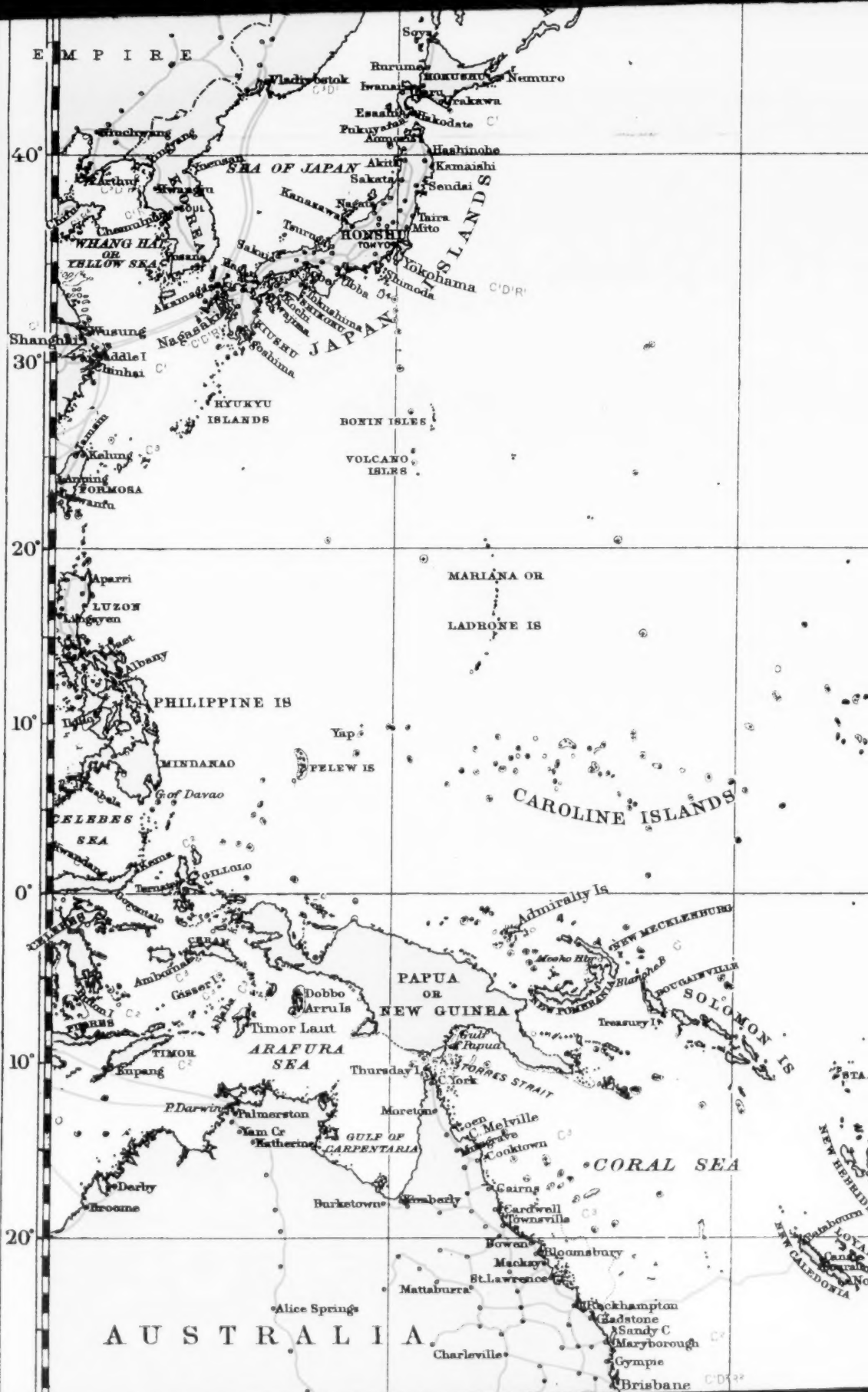
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TUAMOTU

SOCIETY IS  
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Terceira  
S. Miguel

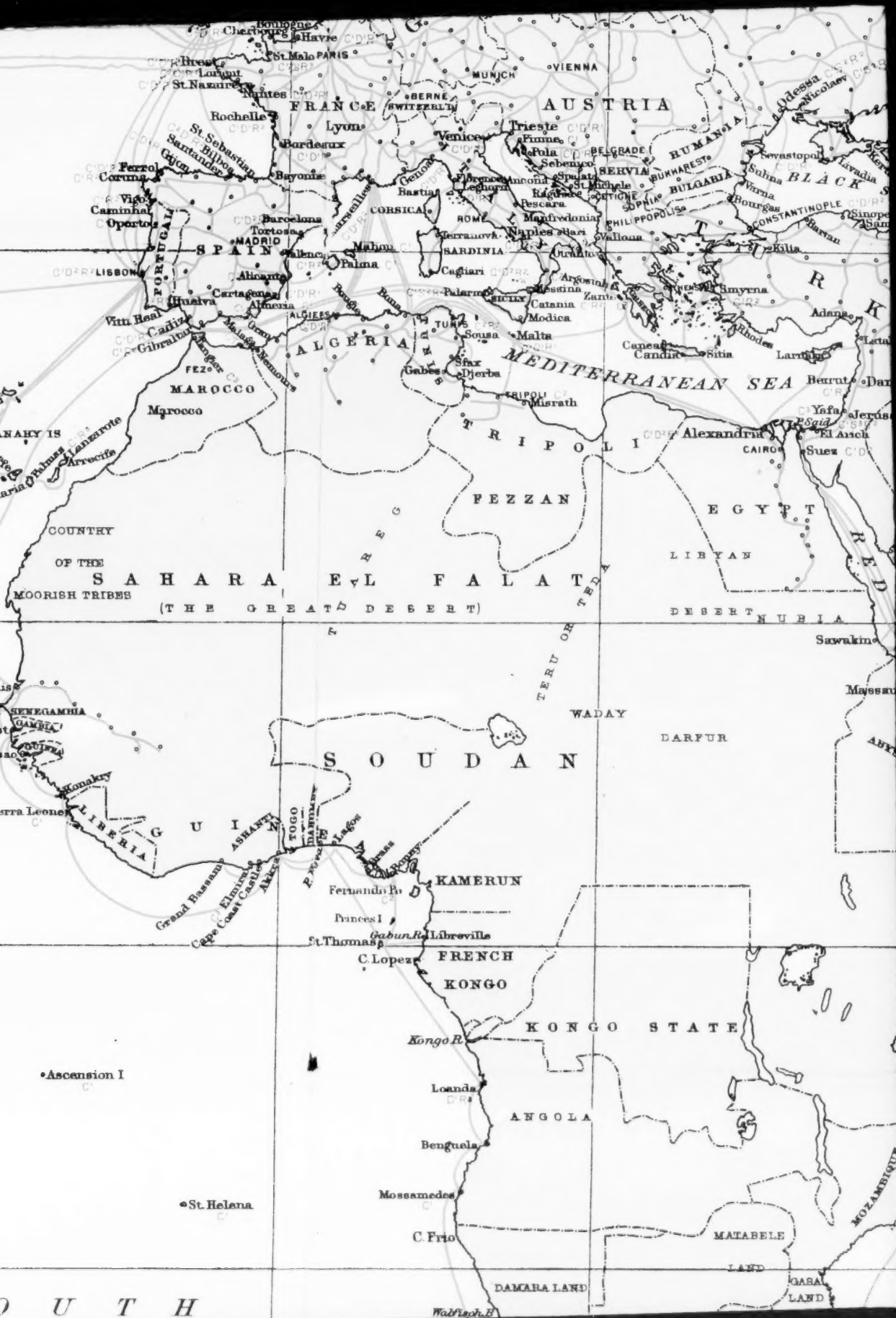
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Bissau

St. Paul

Il. de Roxonha

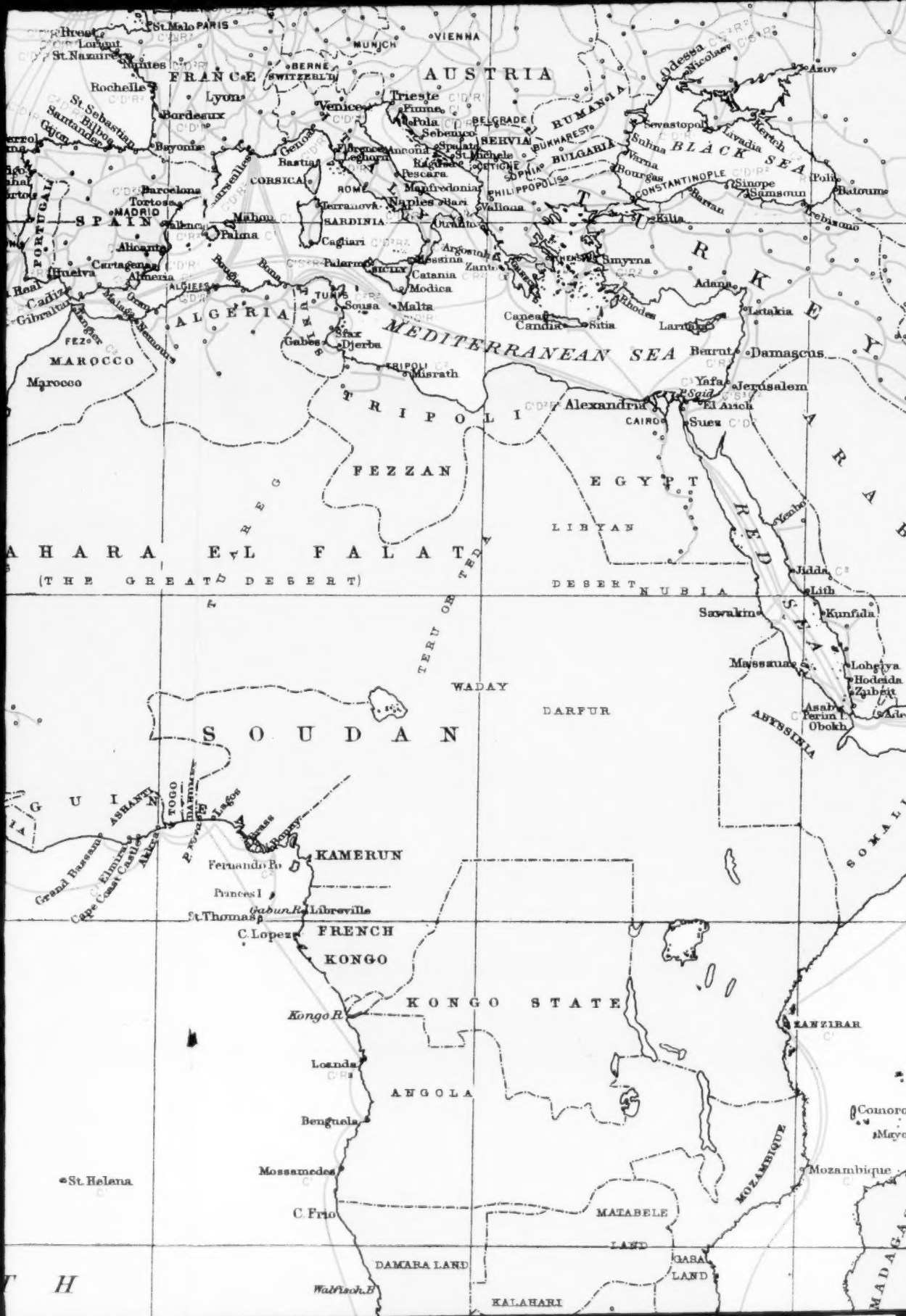
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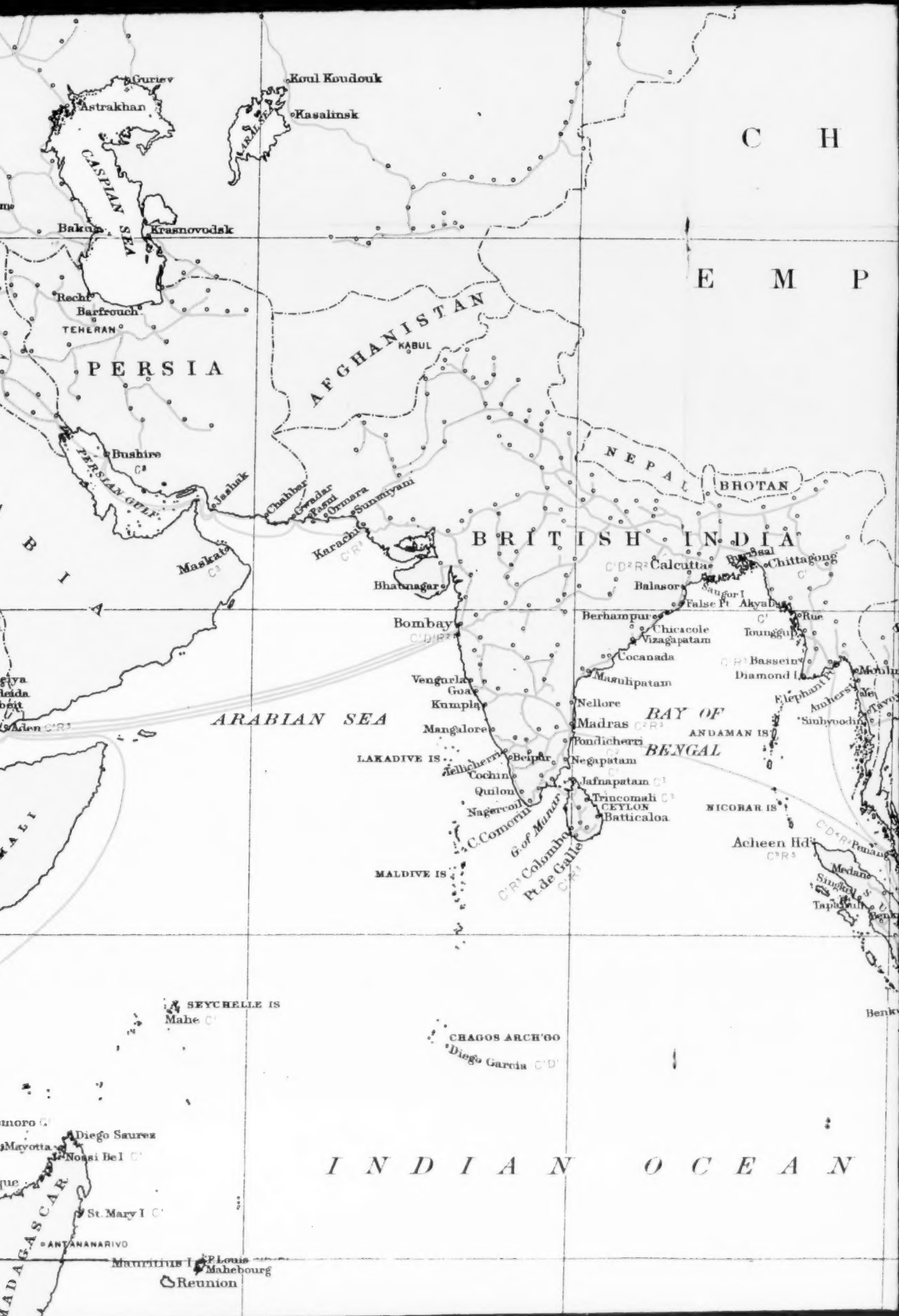
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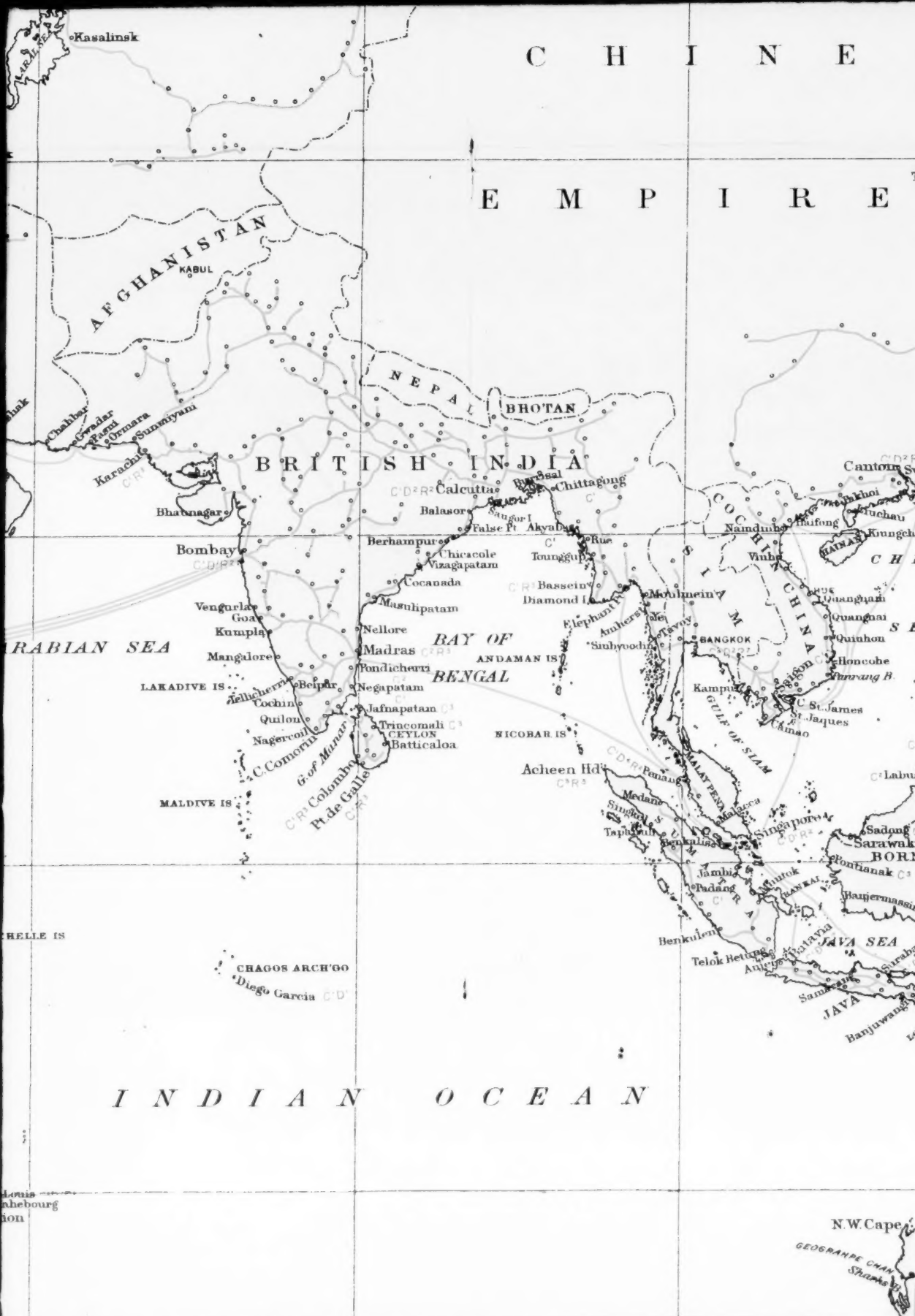
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AFGHANISTAN

KABUL

NEPAL

BHUTAN

BRITISH INDIA

Calcutta

Chittagong

Karachi

Bombay

Berhampur

Chicacole

Vizagapatam

Cocanada

Masulipatam

Nellore

Madras

Pondicherry

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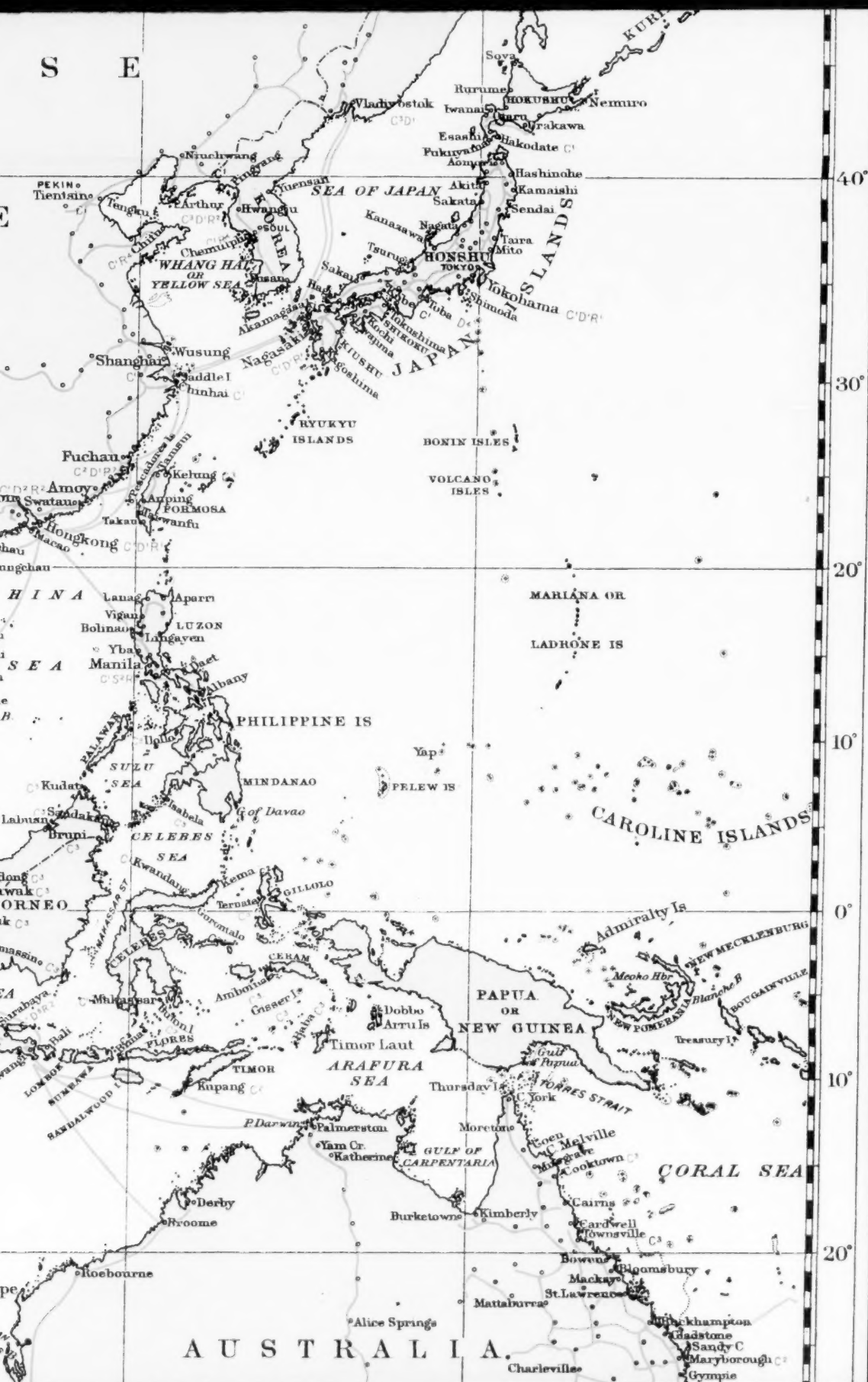
JAVA

Sumatra

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Malacca







S O U T H

O

EXPLANATION

- COALING FACILITIES C<sup>1</sup> Represents  
C<sup>2</sup> "  
C<sup>3</sup> "  
DOCKING FACILITIES D<sup>1</sup> Represents  
D<sup>2</sup> "  
D<sup>3</sup> "  
D<sup>4</sup> "  
S<sup>1</sup> "  
S<sup>2</sup> "

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UNION IS

SAMOAN IS

Apia

Pago Pago

FIJI IS

FRIEDLY IS

TUAMOTU

SOCIETY IS  
Tahiti

MARQUESAS IS

OR LOW ARCH'GO

HERVEY OR COOK IS

Tuvalu or Austral Is

KERMADEC IS

S O U T H

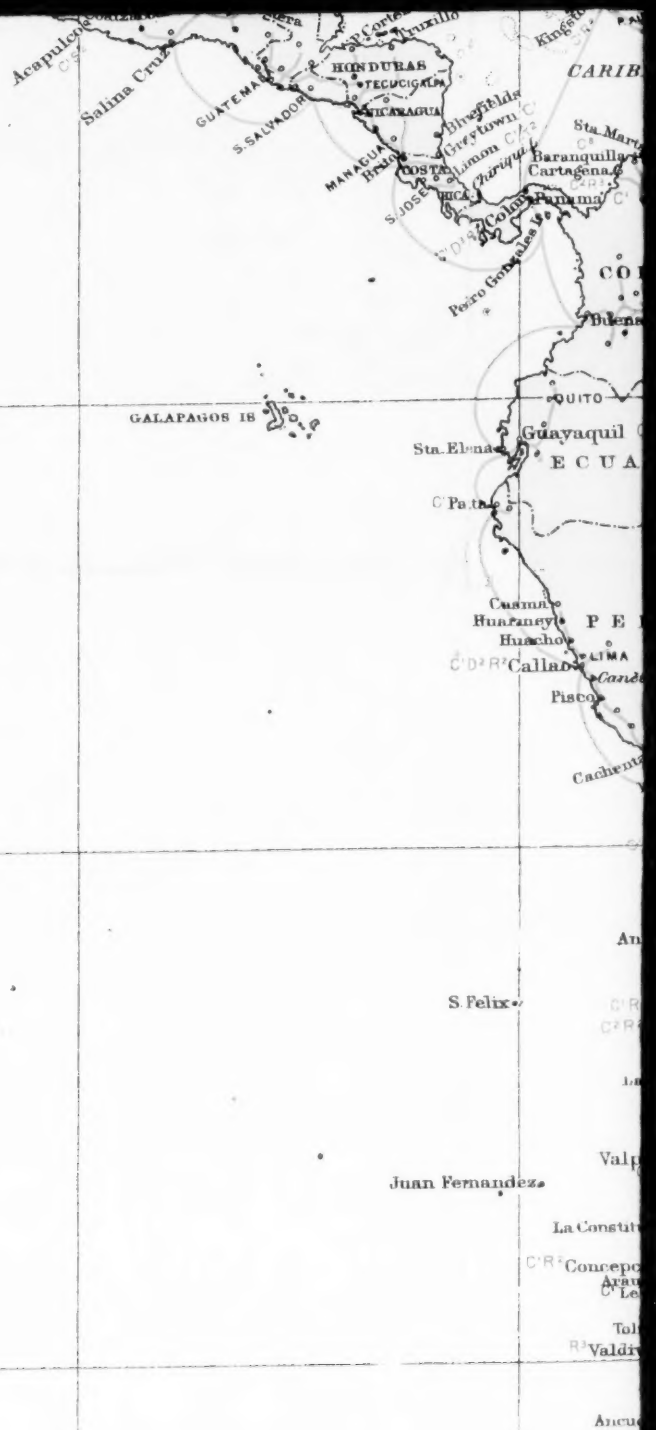
P

O C E

## EXPLANATION O

COALING FACILITIES..C<sup>1</sup>..Represents a 1st class coalin  
C<sup>2</sup> " 2d " "  
C<sup>3</sup> " 3d " "

DOCKING FACILITIES..D<sup>1</sup>..Represents a 1st class dock f  
D<sup>2</sup> " 2d " "  
D<sup>3</sup> " 3d " "  
D<sup>4</sup> " 4th " "  
S<sup>1</sup> " 1st " slip  
S<sup>2</sup> " 2d " "  
S<sup>3</sup> " 3d " "



## OF SYMBOLS

Shipping station where 1 000 tons or more can be procured.

55	55	55	500 to 1000 tons	55	55
55	55	55	100 " 500 "	55	55

ock for vessels 340' x 60' x 21' or larger.

ock for vessels 340' x 60' x 21' or larger.

270' x 50' x 18'

250' x 40' x 15' "

48	"	"	150' x 30' x 12' "	"
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ip " " of 2000 tons or more.

" " " " 1000 to 2000 tons.

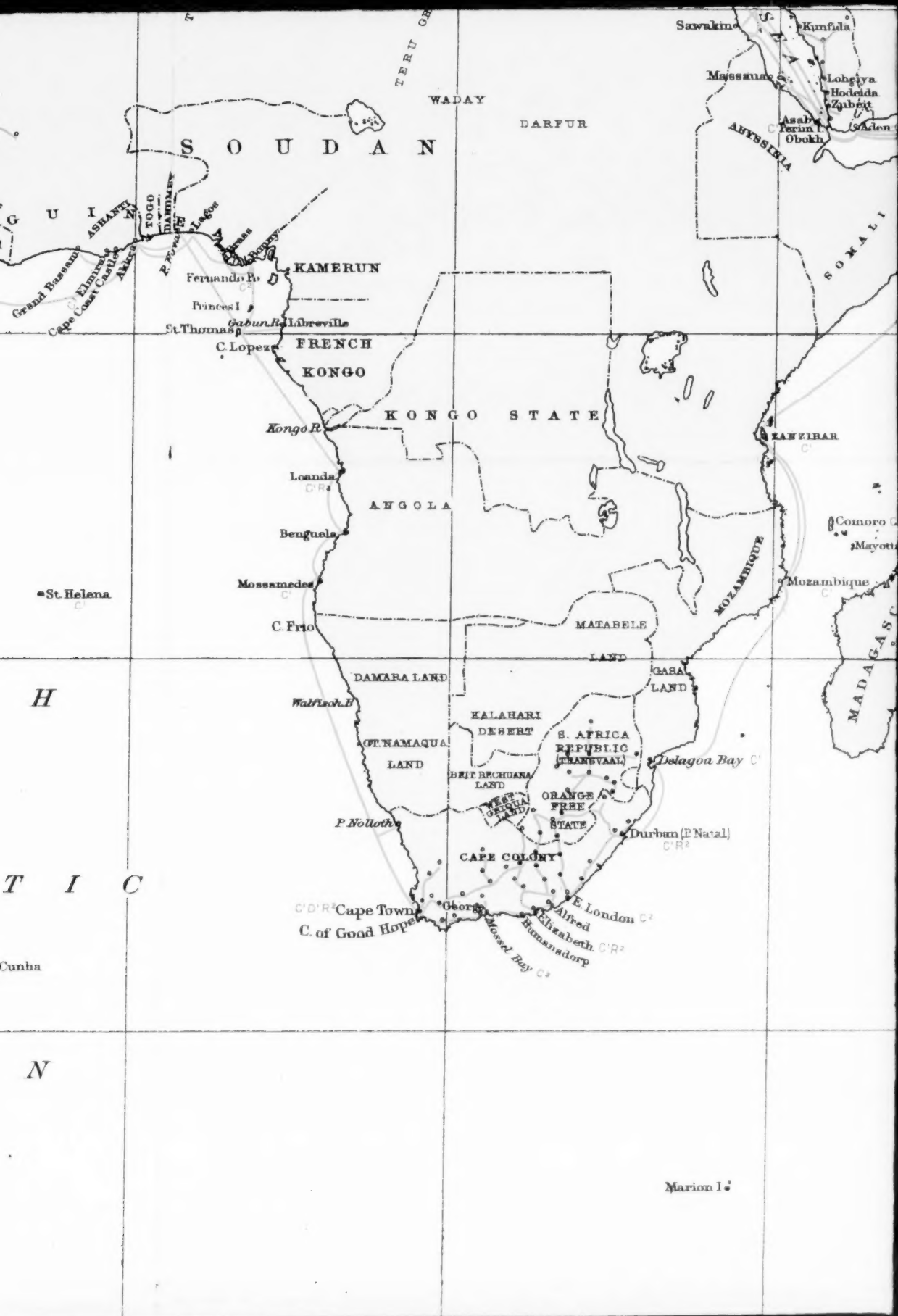
" " " 500 to 1000 "



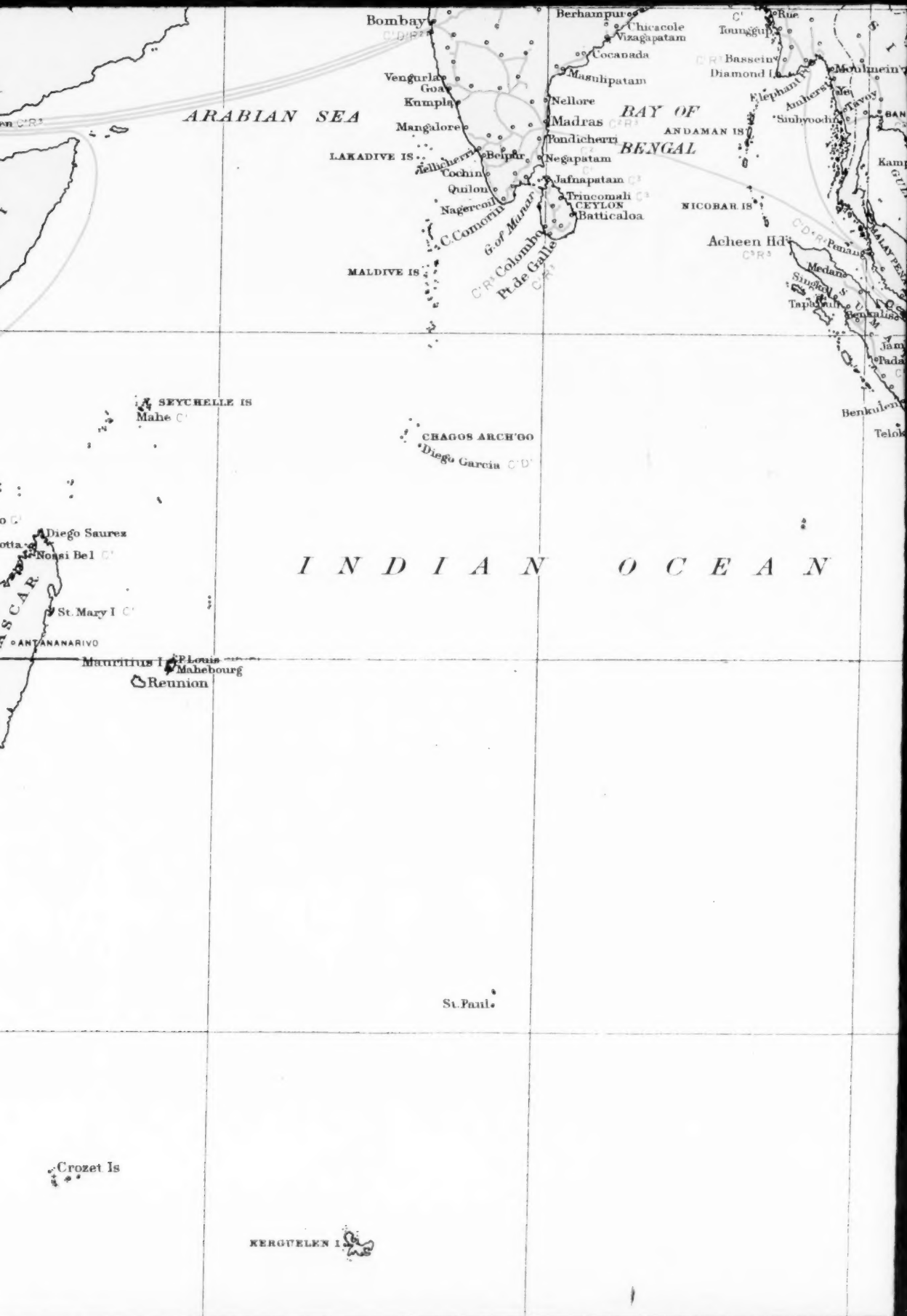


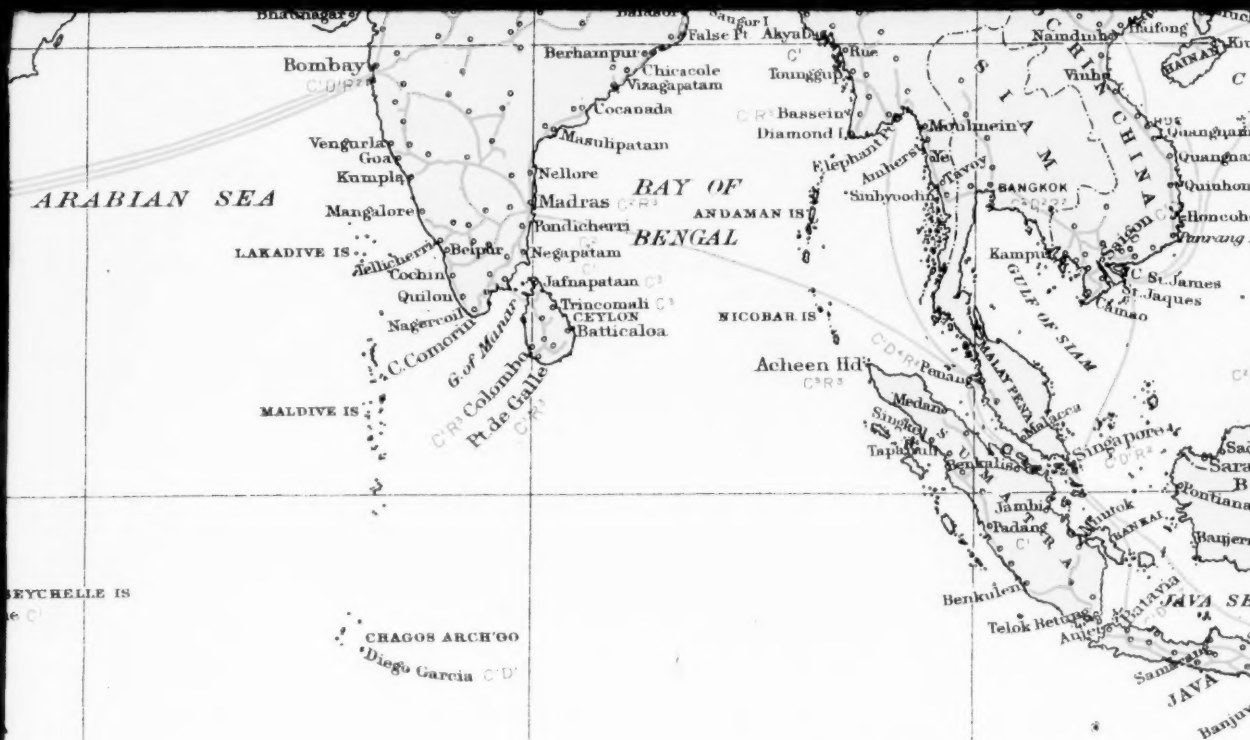












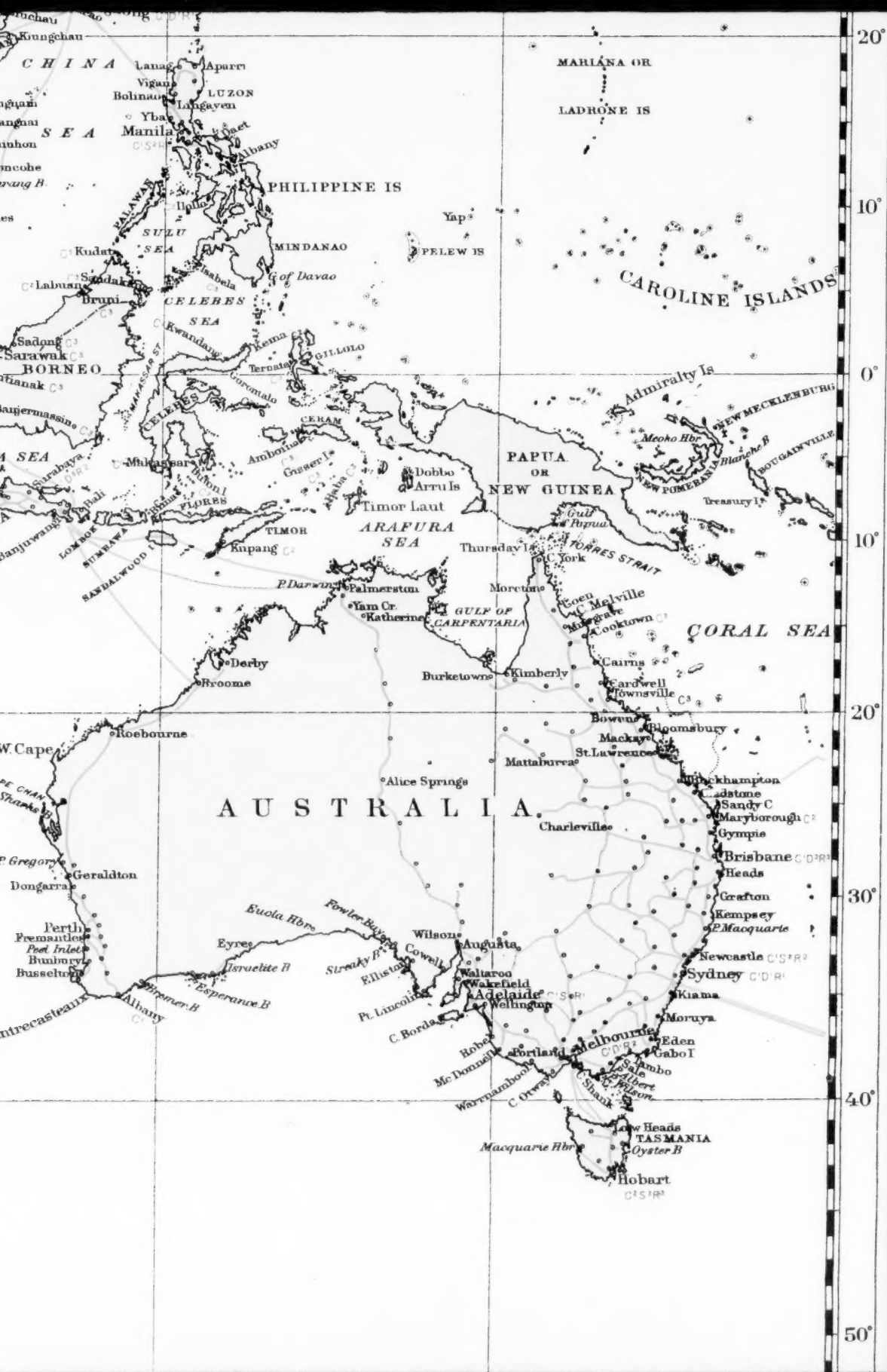
INDIAN OCEAN

P. Louis  
Mahebourg  
Reunion

St. Paul.

KERGUELEN I.

N.W. Ca  
GEOGRAPHE CH  
Shank  
P. Greg  
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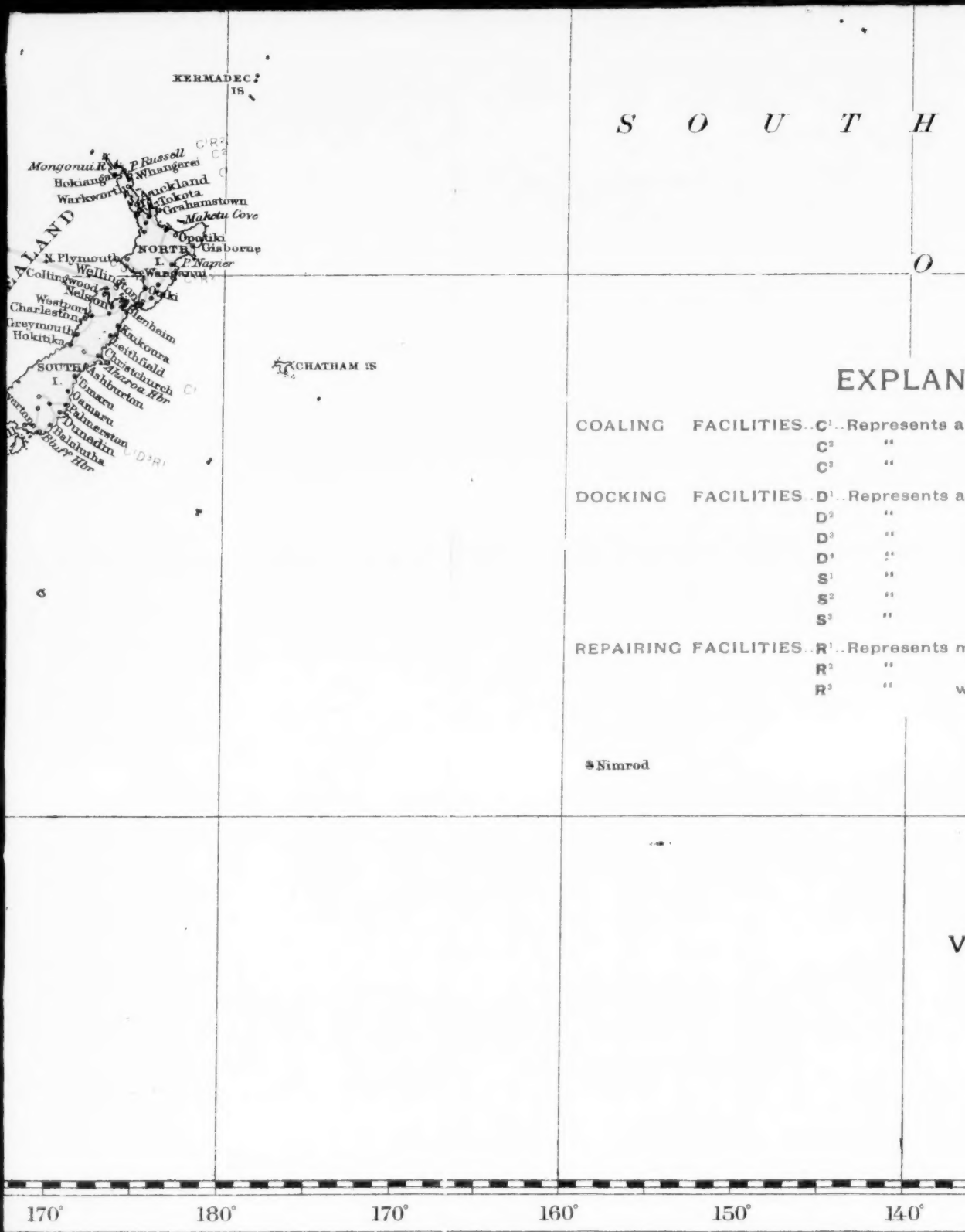


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P A C I F I C

Juan Pe

C E A N

ANATION OF SYMBOLS

ts a 1st class coaling station where 1000 tons or more can be procured.

2d	"	"	"	"	500 to 1000 tons	"	"
3d	"	"	"	"	100 " 500 "	"	"

ts a 1st class dock for vessels 340' x 60' x 21' or larger.

2d	"	"	"	"	270' x 50' x 18' "	"
3d	"	"	"	"	250' x 40' x 15' "	"
4th	"	"	"	"	150' x 30' x 12' "	"
1st	"	slip	"	"	of 2000 tons or more.	
2d	"	"	"	"	" 1000 to 2000 tons.	
3d	"	"	"	"	" 500 to 1000 "	

ts machine shops for building engines and boilers of high power.

" " " ordinary repairs to hull and machinery.

where only the most indifferent repairs can be made.

® Douçnerly I

NAT. GEOG. MAG.  
VOL. VII, 1896, PL. X.

130°

120°

110°

100°

90°

P A C I F I C

Juan Fernandez

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## N OF SYMBOLS

Coaling station where 1000 tons or more can be procured.

" " " 500 to 1000 tons " "

" " " 100 " 500 " " "

Dock for vessels 340' x 60' x 21' or larger.

" " " 270' x 50' x 18' " "

" " " 250' x 40' x 15' " "

" " " 150' x 30' x 12' " "

Ship " " of 2000 tons or more.

" " " " 1000 to 2000 tons.

" " " " 500 to 1000 "

Shops for building engines and boilers of high power.

" " ordinary repairs to hull and machinery.

the most indifferent repairs can be made.

\*Dougherty I

EOG. MAG.  
1896, PL. X.

30°

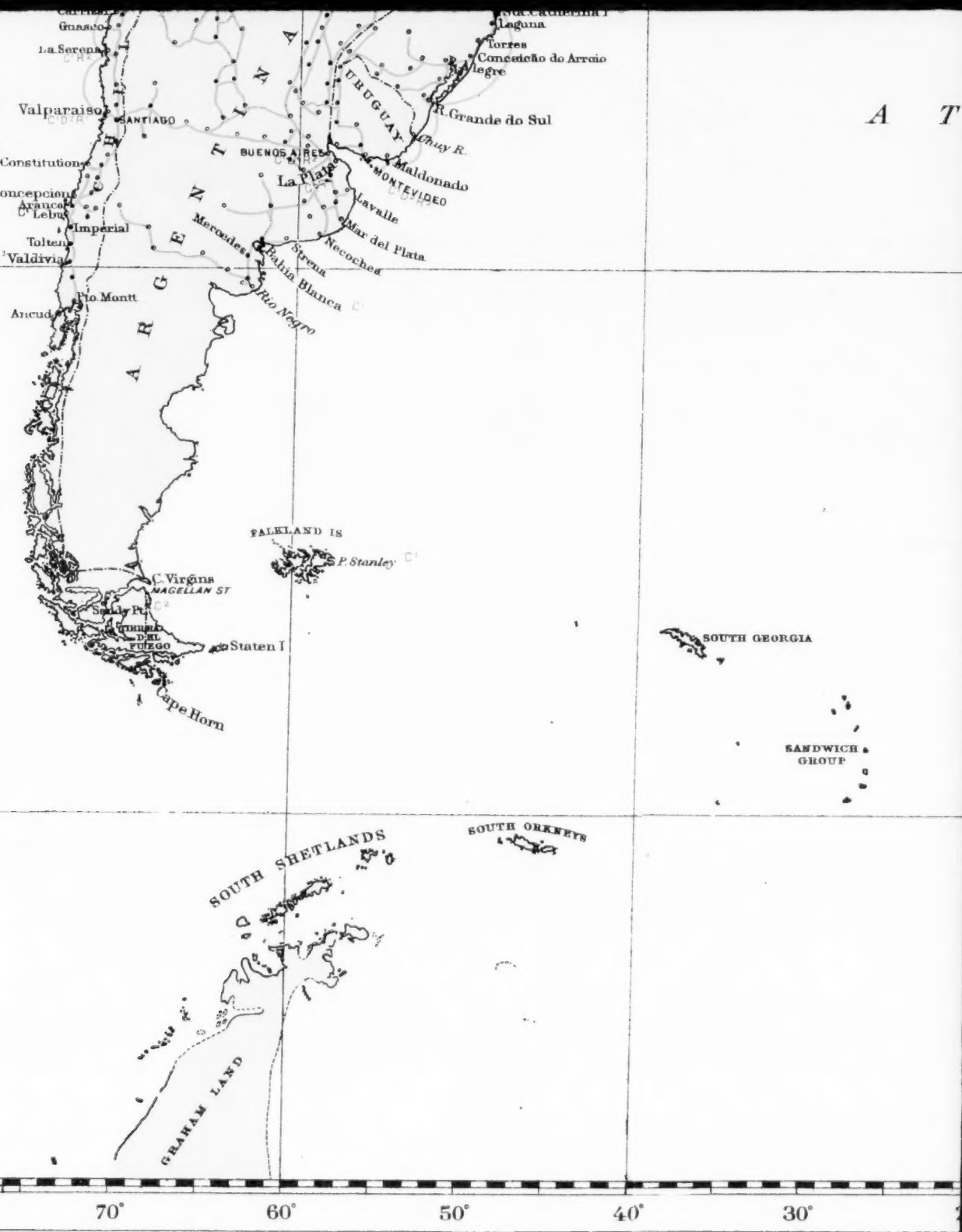
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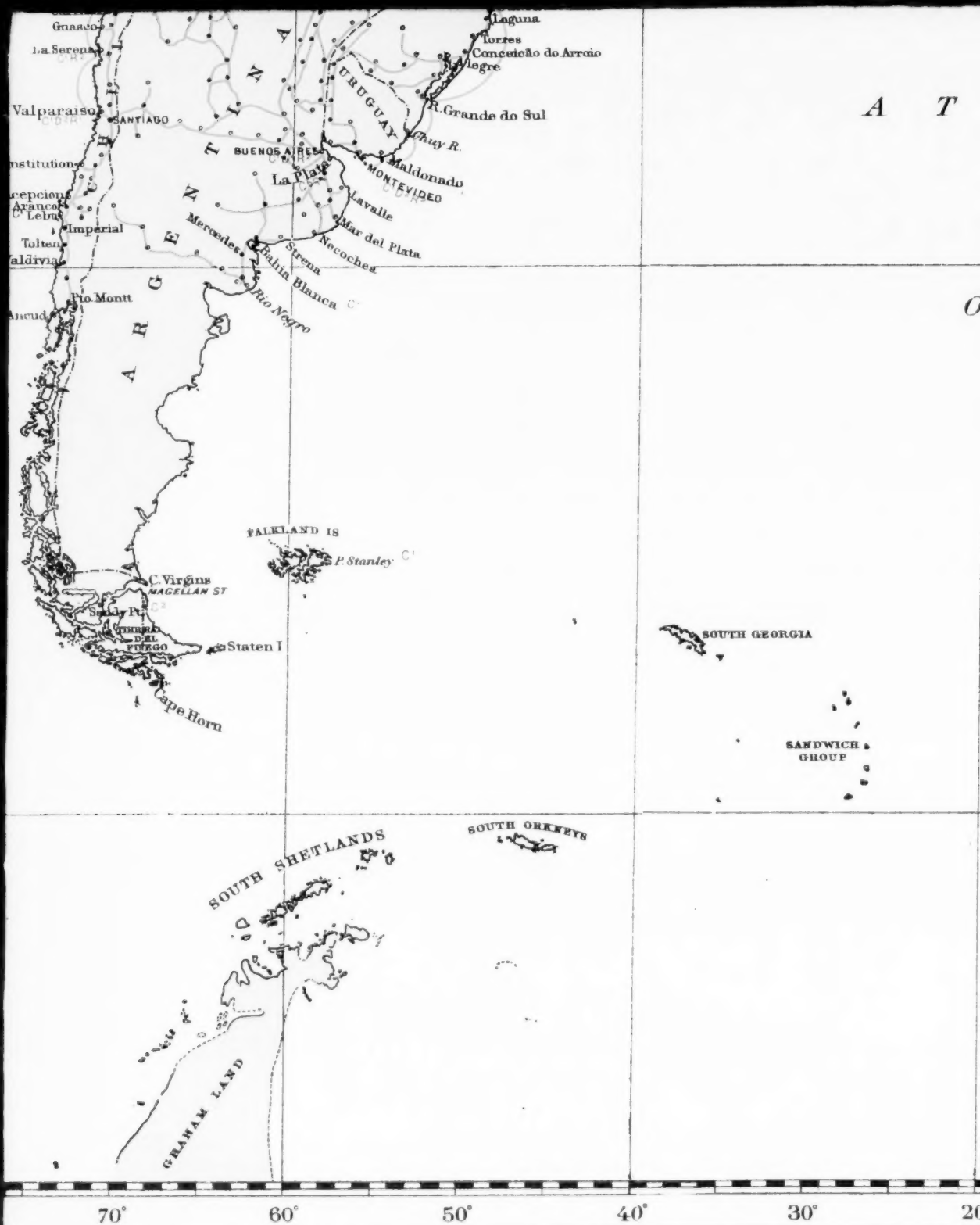
100°

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U.S. Department of the Navy, Bureau of Navigation,  
 Published at Washington, D.C., Feb., 1896,  
 AT THE HYDROGRAPHIC OFFICE,  
 Charles D. Sigsbee, Commander, U.S.N., Hydrographer.



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T L A N T I C

Tristan da Cunha

O C E A N

Bouvet I



20° West Longitude 10°

Meridian of 0° Greenwich

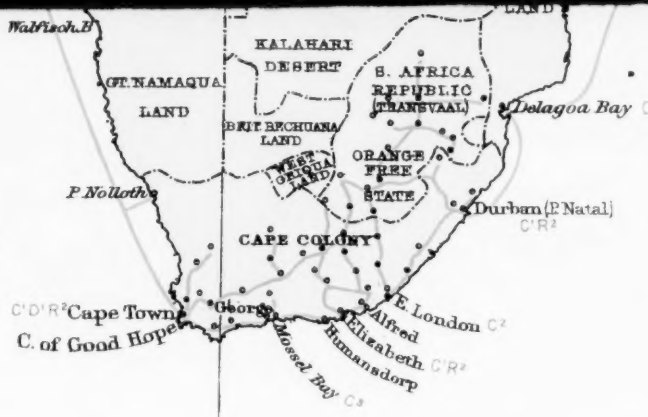
10° East Longitude 20°

30°

U T H

A N T I C

E A N



Longitude 10° Meridian of 0° Greenwich 10° East Longitude 20° 30° 40°







## PETER COOPER AND SUBMARINE TELEGRAPHY

In presenting to its readers a chart of the submarine telegraph cables of the world, THE NATIONAL GEOGRAPHIC MAGAZINE was unwilling that this graphic representation of intercontinental communication should be unaccompanied by some reference to one of its earliest and most effective pioneers, the late Peter Cooper. It is well to recall to the rising generation its indebtedness to Mr Cooper for his eminent services in fostering the initiation of this now elaborate network between the widely separated continents of the earth. With considerable reluctance, and only after repeated urging, one of the actors in this great work, the Honorable Abram S. Hewitt, has outlined, in a letter all too brief, the part played by Mr Cooper. The letter is as follows :

"The story of the Atlantic Cable has been so fully and so well told by the Rev. Henry M. Field in his history, published in 1892 by Messrs Scribner & Sons of this city, that only the briefest outline is necessary to call public attention to the origin of an enterprise which, at the time of its inception, was regarded with incredulity, and whose prosecution and final success have all the elements of a romance.

"My first knowledge of the enterprise was in 1854, when Mr Cyrus W. Field invited Mr Peter Cooper and other gentlemen to listen to the propositions of Frederick N. Gisborne, who had come to New York for the purpose of interesting capital in constructing a line of telegraph across Newfoundland, so as to get the news at cape Race from the European steamers and transmit it thence overland to the gulf of St. Lawrence and thence by fast steamers to cape Breton, whence land lines had been constructed connecting with our American system. In that interview no suggestion was made for a cable across the gulf of St. Lawrence, because it was doubtful at that time whether submarine communication of such length could be established and maintained. The amount of money required was not very considerable, and the gentlemen appealed to, being all men of large views, came to the conclusion that they would contribute the amount, not so much as a commercial speculation as from considerations of the advantage of early news in business transactions affecting the two continents. The Newfoundland Company

was organized, with Mr Cooper as its president and Mr Field as its active manager. The other gentlemen concerned in the undertaking were Moses Taylor, Marshall O. Roberts, Chandler W. White, and, at a later period, Wilson G. Hunt. David Dudley Field also took an interest and was legal advisor of the company.

"Arrangements were made for the construction of the land line without delay, and later, when the experience of the European submarine cables established the practicability of longer lines, it was decided to lay the cable across the gulf of St. Lawrence, a distance of about eighty miles. The first attempt to lay this cable was a failure, owing to the imperfect arrangements for transporting the cable across the gulf, and the occurrence of a storm which caused the severance of the cable when the vessel engaged in laying it was midway between the two termini. It was determined, however, to renew the attempt, and in the following year a cable was successfully laid, and the original plan of the company for intercepting news at cape Race was carried into effect. As a matter of course, the enterprise was not a commercial success, but its advantages were so apparent that the parties in interest concluded that the time had come to make the attempt to continue the cable from Newfoundland to the coast of Ireland. The idea was a daring one; but the highest electrical authorities concurred in opinion that it was feasible. Mr Field proceeded to England to organize a company, in which he succeeded, and which resulted in the attempt to lay the cable in 1857, made by the *Agamemnon* on the British side and by the *Niagara* on the American side. I need not rehearse the story of the successive failures, but the first one occurred in 1857, during the panic of that year, which spread wide ruin throughout the country. Among others, Mr Field was compelled to succumb, and it seemed probable that any further attempt to construct and lay the cable would be abandoned. It was at this juncture that the strong common sense and unshaken faith of Peter Cooper came into play. When the financial storm had abated, he urged Mr Field to undertake the resuscitation of the enterprise, and he offered to advance, and actually did advance, the money required for Mr Field's expenditures, until such time as the success of the cable might be demonstrated and assured. Some of the other gentlemen declined to participate in these advances, and hence the burden upon Mr Cooper was very onerous and gave great concern to his family. Nevertheless Mr Field soon recovered his confidence, and with indomitable courage



and indefatigable industry he finally succeeded in accomplishing the difficult undertaking with which his name and fame are justly identified. So far as Mr Cooper and his family were concerned, they did what they could to secure the success of the enterprise, and I think it may be justly asserted that, without Mr Cooper's assistance and absolute faith in the final success of the undertaking, its realization would have been postponed for many years. In the end he was fully indemnified, and perhaps amply rewarded, for his investment, but without detracting in the slightest from the credit which is justly accorded to Mr Field, I think I am justified in making, at your request, this brief statement, in order to show that without the unflinching courage and coöperation of Mr Cooper, Mr Field would hardly have been in a position to achieve the triumph which he finally secured, and for which his memory is entitled to the veneration of succeeding generations."

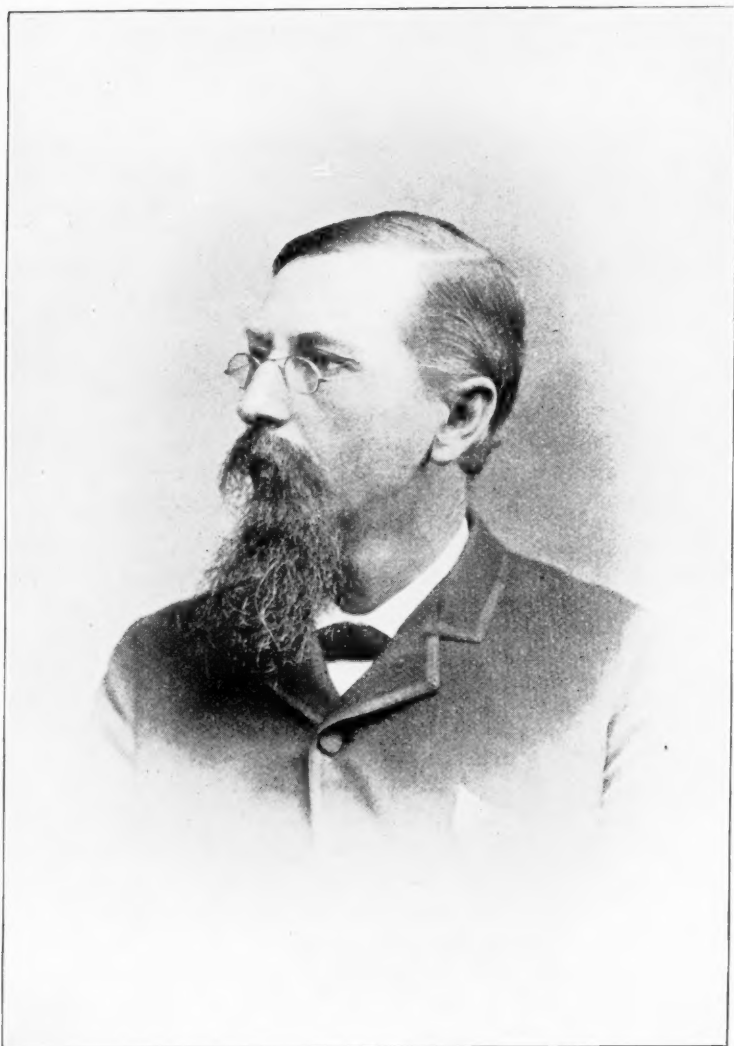
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## THE RUSSO-AMERICAN TELEGRAPH PROJECT OF 1864-'67

By PROFESSOR WILLIAM H. DALL

The possibility of constructing a line of telegraph overland through Siberia and northwestern America had doubtless occurred to many, but the first person to endeavor to give practical effect to the conception appears to have been Mr Perry M. Collins, of California, who in 1856 and for some years subsequently was United States consular agent at Nikolaievsk, on the Amur river, eastern Siberia. By dint of constant activity and perseverance, Mr Collins succeeded in obtaining the concessions necessary to the construction of a line of telegraph, with all needful accessories, from the Amur to the British Columbian line through eastern Siberia and the Russian-American colonies, and also through the British territories in America.

Continual mishaps in the course of the attempts to lay a workable cable across the Atlantic had led many telegraphers to believe that the plan was impracticable, though they had no doubt of their ability to construct and keep in working order shorter lines, such as that proposed across Bering strait. The propositions of Mr Collins were laid before the Directors of the Western Union Telegraph Company, March 16, 1864. They ac-



WILLIAM H. DALL



cepted, by a unanimous vote, the transfer of his rights and interests, and on March 18 completed an organization for the carrying out of the project.

An expedition to explore the proposed route, under Col. Chas. S. Bulkley, formerly of the United States military telegraph corps, was immediately organized. Col. Bulkley reached the Pacific coast in January, 1865. The exploration of the British Columbian line was directed by Edmund Conway, that of Russian America by Robert Kennicott and that of eastern Siberia by Sergius Abasa. The United States detailed Capt. C. M. Scammon, of the Revenue Marine Service, and two other officers to the fleet fitted out by the company, and the Russian government lent the aid of the corvette *Vsadnik*. The first visit was paid to the Russian authorities at Sitka in March, 1865. In July parties were on the way to Siberia, Alaska, and Bering strait. Explorations during this and the following season demonstrated the practicability of the route selected, and saw a small amount of line constructed, every endeavor being made to carry out the project.

In 1867 the Atlantic cable at last proved itself a working success. On the other hand, the experience gained by the expeditions sent out in connection with the Russo-American project showed that the maintenance of the projected line would be so expensive as to make it impossible for it to compete with the Atlantic cable, commercially. Consequently the company decided to withdraw from the enterprise and in the autumn of 1867 the parties returned to California.

The route chosen was up the valley of the Fraser river in British Columbia and down the Yukon to the Nulato bend, thence across country to Port Clarence, where a cable was to connect with the Siberian lines. The latter would leave the Chukchi peninsula, cross the neck of the peninsula of Kamchatka and skirt the shores of the Okhotsk sea, joining the Russian lines at Nikolaievsk. It is stated that a large part of the fourteen millions of dollars represented by the stock was actually expended in the work ; at all events a large amount of money was spent, and the only returns were those public benefits implied by an increase of geographical and other scientific knowledge and the training of a number of explorers and investigators.

## SURVEY AND SUBDIVISION OF INDIAN TERRITORY

By HENRY GANNETT,

*Chief Topographer, United States Geological Survey*

The condition of things in Indian Territory is anomalous. The Territory is an area of some 31,000 square miles, divided among what are called the Five Civilized Tribes—the Cherokees, Choctaws, Chickasaws, Creeks, and Seminoles—the reservation of each tribe being owned by the tribe. Such a thing as private ownership of land is unknown. Each individual entitled to do so is, however, permitted to take up and occupy any land which is not already occupied, but in so doing he does not acquire title.

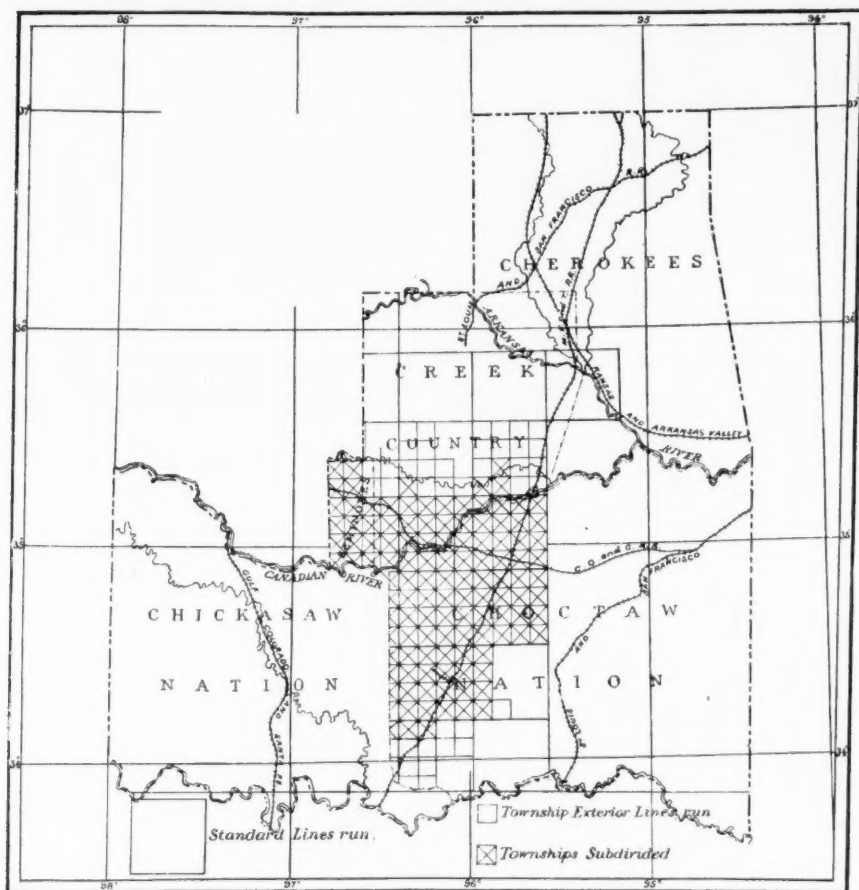
The population of the Territory consists of some 50,000 Indians, a few whites who have married Indian women and have thus acquired membership in the tribe, with the accompanying privileges and emoluments; a few thousand negroes, mostly the descendants of slaves, and a large number, variously estimated at from 100,000 to 200,000, of whites, who are living in the Territory on sufferance, some legally upon the payment of a small tax, others without the shadow of right or authority. These latter are known as interlopers.

As might be expected under this condition of affairs, the whites who have married Indian women, being much shrewder and more experienced than the Indians, have acquired by the right of occupation nearly all the landed property which is worth having in the Territory. They own, if it can be called owning, all the best farming and grazing land, all the timber land which is of immediate value, all the town sites, and all the mineral land which is worth having, and by leasing this property to whites they are rapidly acquiring great wealth.

Although in many respects quite advanced in the arts of civilization, the governments established by these Indians are weak and insufficient. So far as the control of the Indians themselves is concerned, they may have ample power, but at present they are called on to cope with and control a large body of whites, outnumbering themselves at least three to one, and composed largely of the rough, lawless, frontier element; indeed, were not the tribal governments reinforced by the power of the United

States courts the Territory would long ago have been in a state of anarchy.

This situation of affairs, instead of improving with time, is rapidly becoming worse, inasmuch as the number of interlopers in the Territory is constantly and rapidly increasing. The remedy



OUTLINE MAP OF INDIAN TERRITORY, SHOWING PROGRESS OF SUBDIVISION SURVEY UP TO JANUARY 1, 1896.

for this threatening aspect of affairs is plainly the substitution of a territorial government by all inhabitants for the present tribal governments of the Indian minority, the allotment of land to the Indians, and the consequent establishment of land titles.

Foreseeing the necessity of this solution, Congress has for the past two years been endeavoring to treat with the tribes for the

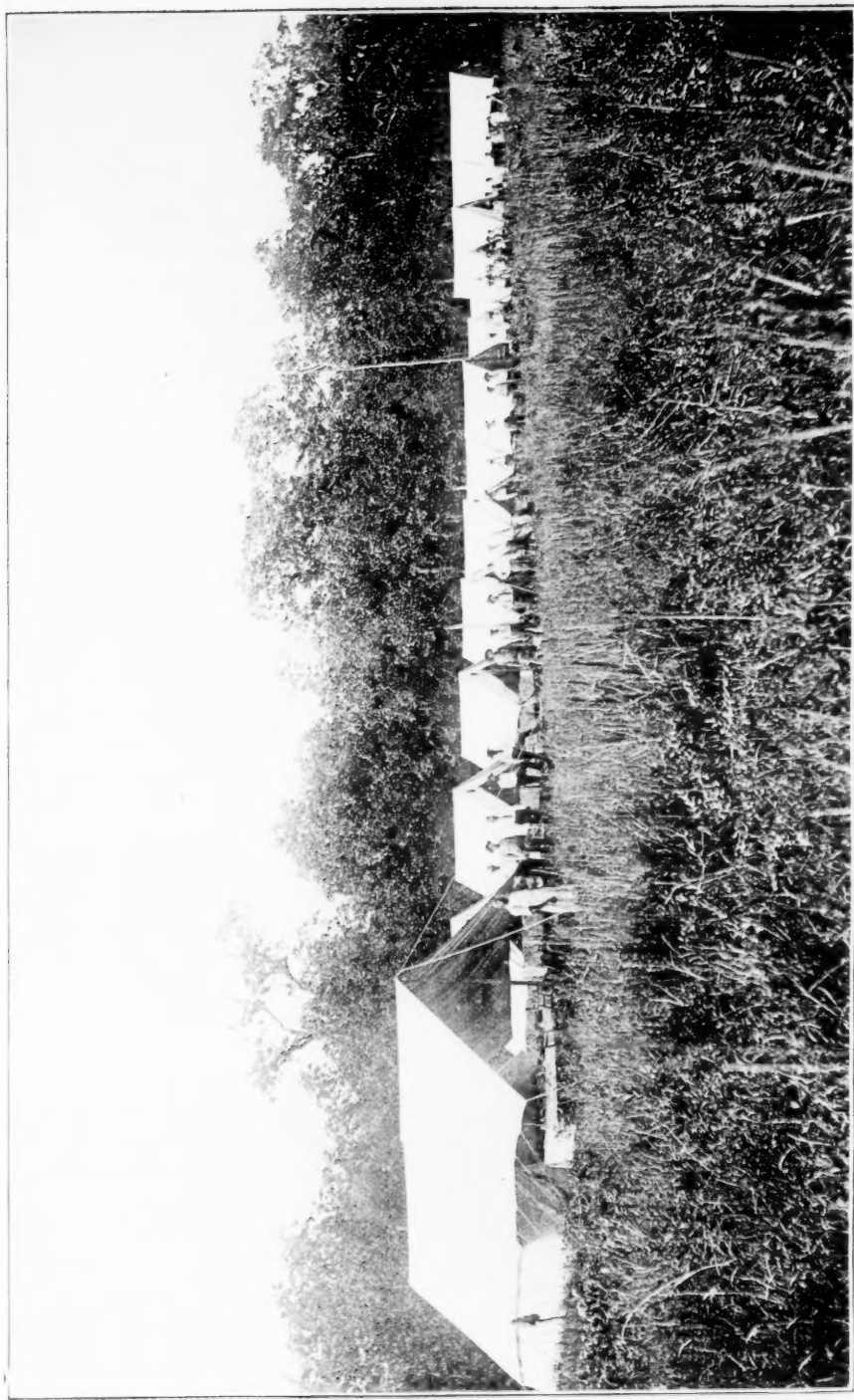
purpose of inducing them to accept their lands in severalty. In pursuance of this object two different commissions have been appointed, each of which has spent several months in the Territory endeavoring to obtain a hearing from the tribes, but thus far without the slightest result. The tribes have declined absolutely to treat with them upon this subject.

During the progress of these attempts at negotiation Congress has taken another step in the same direction. In March, 1895, an appropriation of \$200,000 was made by Congress for commencing the survey and subdivision of the lands of the Territory, being the necessary preliminary step toward allotment. This work was placed by the Secretary of the Interior in the hands of the Director of the Geological Survey, instead of being let out on contract, as has been done in all cases of subdivision heretofore. The Chickasaw nation was excepted, as it was subdivided in 1873. The work was commenced in April under the following plan: The Indian base line, which forms the base line of the Chickasaw nation and of Oklahoma, was adopted for carrying the work into the other nations. The second guide meridian east of the principal meridian of the Chickasaw nation was run northward and southward as a principal meridian for the other nations. Thus while the general system of surveys conforms to that in the Chickasaw nation and in Oklahoma, the work has been so planned as to make it independent of any errors which may have accumulated in the earlier work.

Two parties have been engaged continuously since April last in running standard lines (guide meridians and correction lines) by which the country is divided into blocks twenty-four miles on a side. The township exteriors were run by distinct parties, two parties being at first organized for this work, which were subsequently increased to four. The subdivision of townships into sections was carried on by still a third set of parties, eight of which were organized and placed in the field during the month of May, and the number was subsequently increased to sixteen. Thus the entire work of subdividing the land is carried on by three distinct sets of parties, the work of each checking that of another.

Furthermore, a system of triangulation has been carried over the area subdivided, and the stations in this triangulation have been connected with section and township corners. This is done not only for the purpose of checking and correcting errors, but also to form reference points for the recovery of missing corners,





INDIAN TERRITORY — CAMP OF A SURVEYING PARTY OF THE U. S. GEOLOGICAL SURVEY, 1895



the triangulation points being marked in a very permanent manner. The triangulation rests upon a base line measured on the track of the Missouri, Kansas and Texas railway near Savanna, and the astronomical position of this place was determined as the initial position.

The subdivision parties, by which is to be understood the parties engaged in running the section lines, are grouped, four of them being in charge of an experienced surveyor connected with the permanent corps of the United States Geological Survey, who supervises the work closely and attends to the executive management of the outfit, and who, moreover, commonly with the aid of an assistant, maps the topography of the area subdivided. This latter duty is rendered light by the fact that the surveyor in running the lines locates the points of crossing of every stream, road, or other natural or artificial feature which he encounters in the course of his line. Thus at intervals of a mile or less all the features are located and little remains for the topographer to do except to sketch these features between these points of location.

The progress made in this survey up to the end of January of the present year is set forth in a report which has been made to the Secretary of the Interior. It appears from this that in the primary triangulation 49 stations have been selected, signals built upon them and angles measured from them. By means of these stations an area of about 10,000 square miles, or about five-twelfths of the area of the Territory, excluding the Chickasaw nation, has been controlled. In the subdivision work 11,770 miles had been run out of an estimated amount of 47,000 miles to complete the Territory, or about one-fourth of the entire work. Of the above mileage 970 miles are of standard lines—that is, standard parallels and correction lines; 1,790 miles are exterior lines of townships, 8,770 miles are section lines, and the remaining 240 miles are the meander lines of streams. The work thus far done completes the subdivision of 128 full townships and 26 fractional townships. It is included mainly in the western part of the Choctaw nation, embraces all of the Seminole country and some of the Creek country, while standard lines have been run into the Cherokee nation. The progress is represented upon the sketch map accompanying this paper.

The mapping of topography has followed closely after the work of subdivision, and up to the date given above an area of 4,200 square miles had been thus mapped.

## "FREE BURGHS" IN THE UNITED STATES\*

By JAMES H. BLODGETT,

*Late Special Agent of Census in Charge of Education*

Three bridges across the Potomac river connect the District of Columbia with the State of Virginia. The upper one, known as the Chain bridge, just below the Little falls, the head of tide-water, is too far from dense population to be frequented by foot passengers. Three miles below the Chain bridge is the Aqueduct bridge, practically the head of navigation, since only small pleasure boats and scows to bring stone from the quarries go above it.

Along the Virginia shore, above the Aqueduct bridge, are various "resort houses," more or less permanent, ostensibly for legitimate relaxation and pleasure, but viewed with suspicion by the authorities on both sides of the river, justified by results of occasional raids by officials. At the Virginia end of the same bridge is a straggling group of houses known as Roslyn, a favorite place for those who want to go beyond the police restraints of the District of Columbia, and particularly for those interested in the gambling device known as policy, a sort of lottery, especially attractive to the colored people.

Between the Aqueduct bridge and the Long bridge, two miles or more farther down, at the upper extreme of dense habitation, the low ground on the Virginia side is brushy, with but few houses, and is a rambling place for various kinds of boys and men, who find the towpath of the abandoned canal a convenient footway. The high lands contain the Government reservation, comprising Fort Myer and the Arlington national cemetery. Close to the Virginia end of the historic Long bridge are a few houses known as Jackson City. Freedom from rigid police control has made this a convenient place for gambling in various forms. Close by, known as Alexander's island, is maintained, irregularly, a race-course. Three miles farther is another race-course, known as St. Asaph. A good part of the racing in sight

\*This article, written for THE NATIONAL GEOGRAPHIC MAGAZINE, is less technical and has less of legal citation and quotation of authorities than a paper bearing the same title read before the Anthropological Society of Washington, November 5, 1895. The latter, valuable for purposes of reference and verification, will be printed by the American Historical Association.

of the Capitol has been that known as "outlaw racing"—that is, with horses or with jockeys not in good standing with the regular racing associations. Just below St. Asaph is the city of Alexandria, which is popularly regarded as a part of Alexandria county, to share whatever of good or bad repute attaches to it.

At the census of 1790 all this vicinity was part of Fairfax county, except that Alexandria already had a separate court and was exempt from county taxes. For the organization of the District of Columbia, Virginia ceded to the General Government the jurisdiction\* over a tract bounded by the line extending ten miles northwest from the mouth of Hunting creek, a line northeast from the terminus of the first, and the river, containing an area said to be thirty-two square miles. In 1801 Congress erected the area ceded by Virginia into a county, to be called Alexandria county, but expressly retaining for Alexandria all existing chartered rights. In 1846 the United States re-ceded the tract to Virginia, which has continued to be generally known as Alexandria county, though the policy of separation of city and county, suspended for half a century, has been renewed. The combined population of city and county in 1890 was 18,597, of which 14,339 persons were in the city of Alexandria, which is not a part of Alexandria county, although its name, its vicinity, its recent affinity with the county, and the presence of the county buildings† tend with most persons to make the residents municipally responsible for the unlawful conduct near by. Many persons, while rejoicing in the measure of success attained, do not see why the energetic governor of Virginia sent officers to break up disreputable practices in the county. They do not appreciate the weakness of the real Alexandria county when the gambling elements of the neighboring cities flow out upon it. It has but a little over 4,000 population (1890), of whom, after deducting 164 on the military reservation, over one-half (2,123) are of negro descent, and not yet of much proprietary responsibility.

Alexandria is but an example of the cities of Virginia from the earliest days. James City, better known as Jamestown, and now extinct, was established as the chief city in 1639. Williamsburg was set apart as a city, to be used for no other purpose whatever, and defined as the capital in 1699, and again in 1705, in advance of population. There was a general plan to put in each county

\* The ownership remained in the existing proprietors. Certain authors erroneously state that the title or possession was transferred.

† A bill is pending for erection of county buildings outside of the city.

a similar town for commercial purposes, especially for warehousing and marketing tobacco. Norfolk, chartered as a borough in 1737, has lost that name, but its relations to the county are to-day like those of the original charter, gradually defined, strengthened, and confirmed, in points of dispute, in favor of the municipality. At first the Norfolk county buildings were in Norfolk, and a special clause in the charter reserved proprietary rights in them to the county. Later legislation authorized their sale and the erection of county buildings outside of Norfolk. The buildings are now in Portsmouth.

In 1776 many boroughs which had been given separate representation in the assembly were cut off by a law which prescribed that no borough with a population less, for seven successive years, than half that of any county should be separately represented. In the same year the delegate for William and Mary College, specified in its charter, was cut off.

In the state law for apportionment of members of Congress, 1892, the following names of cities are given separate from names of counties: First district, Fredericksburg; second, Norfolk, Portsmouth, and Williamsburg; third, Richmond and Manchester; fourth, Petersburg; fifth, Danville and the town of North Danville; sixth, Lynchburg, Radford, and Roanoke; seventh, Charlottesville and Winchester; eighth, Alexandria; ninth, Bristol; tenth, Staunton. To these are to be added Buena Vista, in the tenth district, chartered on the day of the approval of the apportionment bill, and Newport News, for which the bill was signed January 18, 1896. The conditions for the town of North Danville are in transition. It has been a town independent of Pittsylvania county, but judicially dependent on Danville. The name has recently been changed to Neapolis, and just too late for insertion here it will be determined by popular vote whether it shall be consolidated with Danville.\*

In early days there was a disposition in certain other colonies to establish cities independent of counties. In New Jersey and in Maryland such early independencies as survived came under county control. In Pennsylvania the claims of Germantown to independence of the taxation of Philadelphia county were overruled by the governor. In Virginia, from the incorporation of James City (1639), it has been the steady policy to have the cities independent of the counties. It confuses some students

\* By popular vote, on February 20, Neapolis is to become a part of Danville on July 1, 1896.

to find an occasional participation of urban residents and rural residents in local affairs, but on examination of charters it will be found that this extends only to subjects expressly named in any instance.

If one will examine the scheme of government for the city and county of St. Louis, Missouri (1876), he will find that *all* power of county officers was abrogated. The same act restored their power for the rural portion, now St. Louis county, leaving the city to be provided with a separate government in the same act. The situation in Virginia may be clearer if the legislature is deemed to have abolished all county authority in any city under consideration, and then to have restored by name such items of power as circumstances demanded.

The present cities of Virginia have the following characteristics:

The Code defines a city as a town having over 5,000 inhabitants and a hustings court, and defines a town as an incorporated town having less than 5,000 population.\*

The cities have distinct courts. Their citizens do not pay county taxes on city property. They do not serve on county juries. Deeds and other papers affecting city property are recorded by city officers and not by county officers.

Generally, residents of cities do not participate in county elections. Exceptionally, they may hold county offices, more exceptionally, they may vote for county officers.

Generally, city police courts have jurisdiction one mile beyond corporate limits. Exceptionally, there is a limited concurrent jurisdiction of city and county courts, as over waters adjacent to the cities of Norfolk and Portsmouth and to Norfolk county.

Generally, the county and the city have each a set of public buildings within their respective borders. Exceptionally, authority is given to a county for buildings in a city, as when, at the chartering of the city of Manchester, Chesterfield county was authorized to continue to use its public buildings therein till other arrangements could be made. This authority sometimes embraces arrangement for joint occupancy, as when Norfolk county was authorized to arrange with the city of Portsmouth for the location and construction of a jail.

Generally, a county officer may not serve writs in a city. Exceptionally, he can serve writs in the city on residents of his

\* The venerable city of Williamsburg has a smaller population, but its site is expressly set apart for a city.



county, as witnesses may be summoned for Campbell county in the city of Lynchburg.

Except for individually specified purposes, county and city are as distinct as two counties.

The city of Newport News, Virginia, was organized January 20, 1896, under a charter naming officers to serve till July. The charter contains the following paragraph:

"115. The city of Newport News, its real and personal property and other subjects of taxation, and its inhabitants shall be exempt from all assessments and levies in the way of taxes imposed by the authorities of Warwick county for any purpose whatever, except upon property owned in the said county by the inhabitants of said city, from and after the first day of January, eighteen hundred and ninety-six, nor shall said inhabitants be liable to serve upon juries or work upon roads in said county except in such cases as are provided for by the laws of the state."

This extract states an exemption of residents in cities from county taxes and from duty on county juries prevalent in the state.

The present facts regarding the cities of Virginia are little known beyond the state. The Congressional Directory is conspicuous as a public document out of the state that shows the cities separately. The Civil Service Commission has found it necessary to recognize the certificate of an officer of a city court of record for Baltimore, St. Louis, and the cities of Virginia where a certificate from a county court was contemplated. A list of cities in Virginia paying no county taxes occurs in the Report of the Tenth Census (1880), volume 7, page 117.

Ordinarily, in this country, a city is part of a county; it is set apart that a dense population may establish new values and impose new taxes to meet special demands for public welfare; it continues to pay county taxes.

The difficulty of harmonious action by sparse and dense populations upon subjects common to them has led to exceptional separation of cities from counties—Baltimore, Maryland, by successive steps, culminating in 1823, and St. Louis, Missouri, through popular vote in 1876.

These two instances are explained in the Johns Hopkins University studies in historical and political science—*Local Institutions of Maryland*, in volume 3, and *City Government of St. Louis*, in volume 5, the latter being most minute, and con-

stituting a monograph in itself, and yet the existence of cities independent of county control and of county taxes is denied in certain histories and works on civil government used in high schools, colleges, and universities.

In many states the administration of the public schools is largely through municipalities charged with that work and superimposed upon areas occupied by other municipalities charged with other interests. There is a very general tendency to charter school districts independent of the town in the north or of the county at the south. In some states this method of enabling a community to do what the larger unit of which it has been part is not ready to do bids fair to increase. This form of legislation is more common in the west and south than in the northeast. The forms which these educational municipalities assume are numerous, and the complications produced are often intricate.

The complications are probably most intricate in those states formed of the public domain which have township organization, a modified form of the town government of New England. It will be most convenient to limit illustration to the organizations which possess taxing powers, disregarding subdivisions made simply for details of administration of a larger unit, like a voting precinct as a division of a county without taxing power. National, state, and county taxes bear upon property-owners throughout the country, with the exception of county taxes in St. Louis, Baltimore, and cities of Virginia, as already explained. The national taxes are so largely collected on goods in bulk before their distribution that most consumers either do not recognize them or persuade themselves that somebody else pays them.

Below the county tax come the multitudes of variations. The congressional township of the land survey, six miles square, in its simplest organization became a school township—a plan encouraged by the grant to the state of a section or of two sections or square miles in a township for school purposes. This school corporation is often subdivided into districts, each with its taxing power. There are instances of superimposed incorporation of the town as a high-school district with taxing power. Turning from school administration, we find the same area made a civil township, with care of roads, the poor, and other subjects. Within this township may grow up a compact body of population to be chartered as a village, a town, or a city, according to circumstances, with taxing power for police and other purposes. In some instances, like Springfield, Illinois, these units will as-

sume the charge of schools; in others, like Aurora, Illinois, the city does not administer the schools, which remain under the districts into which the school township was divided.

A citizen may therefore find himself under three sets of taxes for schools—the township and the district for common schools and the high school township for its specialty. He may have in addition the civil township tax and the corporation tax. When the school district is given a charter making it independent of its town, the succession of taxes is modified. A volume would hardly suffice to instance all the variations and combinations of duties of the taxpayer in different states, or even in different parts of the same state, growing out of the separately chartered taxing powers and their limited independencies.

The cities of Washington, D. C., which has practically absorbed Washington county and become identified with the District of Columbia; Philadelphia, Pennsylvania; New York; Brooklyn (January 1, 1896), New York; New Orleans, Louisiana, coextensive with Philadelphia, New York, and Kings counties and Orleans parish respectively, but continuing to exercise some functions of counties, and San Francisco, California, identical with San Francisco county, represent simply a growth by which cities have filled county boundaries, and not an independence of counties.

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## GEOGRAPHIC LITERATURE

The receipt at a somewhat late hour of two important articles published in this number of the magazine has necessitated the holding over until April of the entire Department of Geographic Literature.

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## PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1895-'96.

*Special Meeting, January 31, 1896.*—Vice-President Greely in the chair. Mr Richard Villafranca, Commissioner General from Costa Rica to the Atlanta Exposition, read a paper, with lantern-slide illustrations, on The Geography, People, and Resources of Costa Rica.

*Regular Meeting, February 7, 1896.*—Vice-President Merriam in the chair. Mr W J McGee delivered an address, illustrated by lantern slides (mostly from original photographs), entitled "A Sojourn in Seriland: Explorations among Hostile Savages of the Gulf of California."

*Special Meeting, February 14, 1896.*—President Hubbard in the chair. Commander Z. L. Tanner, United States Navy, described his cruise in command of the United States Fish Commission steamer *Albatross* from the north Atlantic to the north Pacific, via the strait of Magellan and the Galapagos islands. Practical details of the scientific work and views of the various ports visited were given by means of lantern-slide illustrations.

*Regular Meeting, February 21, 1896.*—President Hubbard in the chair. Hon. George C. Perkins, United States Senator, read a paper, illustrated by lantern slides, on California: her Geography, Scenery, and Resources.

ELECTIONS.—New members have been elected as follows:

*February 3.*—John M. Comstock, Dr F. P. Dewey, Herbert Forsyth, Capt. D. D. Gaillard, U. S. A., Edward M. Kindle, Gen. Nelson A. Miles, U. S. A., R. A. Pearson, W. S. Post, W. P. Robinson, Wm. A. Taylor, Col. W. B. Thompson, Thos. L. Watson, Hon. Andrew D. White.

*February 14.*—Dr J. O. Adams, W. H. Baldwin, Jr., Miss Amy M. Bradley, Levi J. Bryant, Mrs M. L. Byington, Mrs J. A. Campbell, Col. H. W. Closson, U. S. A., J. Ashley Cooper, Gen. W. P. Craighill, U. S. A., Claas Denekas, Pay Inspector L. A. Frailey, U. S. N., Chief Justice Melville W. Fuller, Col. D. S. Gordon, U. S. A., Dr Ida J. Heiberger, F. J. Heiberger, James G. Jester, Lieut. W. Lacy Kenly, U. S. A., Mrs W. H. Kerr, T. A. Lambert, James B. Lambie, Noble D. Lerner, Daniel W. Lord, Wm. G. Lown, Samuel Maddox, Chas. Addison Mann, Jr., Edward J. McQuade, Hon. John L. Mitchell, U. S. S., W. Henderson Moses, Owen Owen, A. S. Perham, August Peterson, Dr Chas. V. Petteys, Robert A. Phillips, Mr J. B. Pioda (Swiss Minister), Rev. Philip M. Prescott, J. M. Rieman, John W. Saville, Thos. W. Smith, Capt. J. A. Snyder, U. S. A., W. E. Speir, Pearce Thompson, Capt. R. Vance, U. S. A., W. H. Veerhoff, Dr John E. Walsh, John Sidney Webb, Oscar W. White, Ernest Wilkinson.

OBITUARY.—General John Gibbon, a distinguished officer and gallant soldier, died in Baltimore February 6. Graduating at the United States Military Academy in 1847, he rose to be a brigadier-general in the regular Army and a major-general of Volunteers. Alike against the Seminoles in Florida and the Nez Percés and Sioux in the northwest, in the Mexican war and in the war for the Union, he served with conspicuous gallantry, winning distinction whether he was in command of a regiment, a brigade, a division, or an army corps. The most desperate battles of the army of the Potomac found him at the front, and he was severely wounded both at Fredericksburg and Gettysburg. As a man, General Gibbon was greatly respected, and The National Geographic Society deplores in his death the loss of a valuable member, who in the course of 45 years of active service had gained a practical knowledge of the geography of the United States such as few men have the opportunity of acquiring.

No one unacquainted with Professor W. H. Dall's earlier work as an explorer would imagine from the reading of his modest article on pages 110 and 111 that he himself bore an important and honorable part in one of the expeditions to which he refers. To all, however, except the younger generation, this fact is well known, as is the further fact that Professor Dall's continued explorations and researches in Alaska and the North Pacific ocean for the long period of 30 years have led to his recognition as one of the best informed men of the time on all matters relating to that most interesting and increasingly important section of the globe. After the abandonment of the overland telegraph project in 1867, Mr Dall remained for some time in Russian America, witnessing its transformation into Alaska as the result of its purchase by the United States. On his return, he published numerous articles of great scientific value, and in 1870 appeared his well known work on Alaska and its Resources. As an assistant in the U. S. Coast Survey from 1871 to 1874, he devoted himself largely to Alaskan studies, making repeated visits to the far north and publishing from time to time the results of his investigations concerning it. In 1884 he joined the U. S. Geological Survey, of which he has since remained an officer. He is also closely identified with the Smithsonian Institution, of which he is an honorary curator.

The proposal to establish a permanent directorship-in-chief of scientific bureaus and investigations in the Department of Agriculture, to give coördination and continuity to the many-sided scientific work of the Department and to complete the good work done by the present Secretary in protecting the scientific force from the onslaught of the political spoilsman, has excited great interest in the scientific world and called forth a very notable expression of favorable opinion from a large number of eminent scientists and scientific educators. Within a brief period—in fact, since February 18, President Gilman and the faculty of Johns Hopkins, President Dwight and the scientific faculty of Yale, President Schurman of Cornell, President Low of Columbia, President Adams of Wisconsin, President Francis A. Walker of the Boston Institute of Technology, Dr Shaler, dean of the Lawrence Scientific School at Harvard; Dr John S. Billings, of New York; the Joint Commission of the Scientific Societies of Washington, and the presidents and other officers of various state universities and colleges have given the proposal the very strongest indorsement. While the recommendation is scarcely likely to be favorably acted upon at the present session of Congress, it is too obviously a step in the direction of a more effective and at the same time more economical administration—too manifestly in the interest of good government in general—for its adoption to be long delayed.

A preliminary announcement of the Mexican census of 1895 gives a total population of 12,542,057, as against 9,908,011 at the census of 1879, and 11,632,924 as officially estimated in 1889. The population of the principal cities is said to be as follows: City of Mexico, 339,935; Puebla, 91,917; Guadalajara, 83,870; San Luis Potosi, 69,676; Monterey, 56,835; Merida, 56,702; Pachuca, 52,188; Durango, 42,166, and Zacatecas, 40,026.

## A JAUNT INTO MEXICO.

Twenty years ago Mexico was practically a closed country to the tourist from the United States. Then, the facilities for transportation were such that the journey into the quaint land lying to the South of us implied weeks of arduous travel, which only those inured to hardships could stand. Now, the tourist gets into his Pullman Sleeper at New Orleans and the Southern Pacific quickly lands him in "the land of the afternoon." The way leads through the beautiful bayou region of Louisiana, then amid the vast pine forests that fringe the eastern edge of the Lone Star State, past Houston, the great cotton mart, and San Antonio, the beautiful city of the Alamo and the Missions. At Spofford the Mexico sleeper swings off from the main line and in a little while one crosses the Rio Grande at Eagle Pass, and finds one's self upon the soil of the sister Republic. From here to Torreon the way leads over the Mexican International, and then straight down the Mexican Central, past many quaint and Medieval towns, through fertile valleys, where men are plowing with slow-moving oxen, over mountain passes, where the hill tops flatten into grotesque shapes—to the City of Mexico. Every mile of the way is fraught with novel interest. At each stop the train makes, quaint groups gathered at the station claim attention. Their dress is picturesque, their speech is vigorous but musical. They importune one with all sorts of confections and trinkets for sale. The domed cities and towns which line the way or are visible in the distance, have the atmosphere of villages in Palestine. One may make a visit limited by days, or wander for weeks and not be satiated. The interest of the city itself is inexhaustible, while Zacatecas, the great mining center perched high among the mountains; Guadalajara, the Boston of the country; San Luis Potosi, with its architecture and its art, or Vera Cruz or Tampico, lying amid coffee and banana plantations upon the seacoast, are but a few of the hundreds of places that attract and charm. You will never regret a journey into Mexico, which can be made so cheaply and expeditiously via New Orleans and the Southern Pacific. Consult the nearest Southern Pacific agent for rates and information, or write to S. F. B. MORSE, General Passenger and Ticket Agent, Southern Pacific Company, New Orleans, La.

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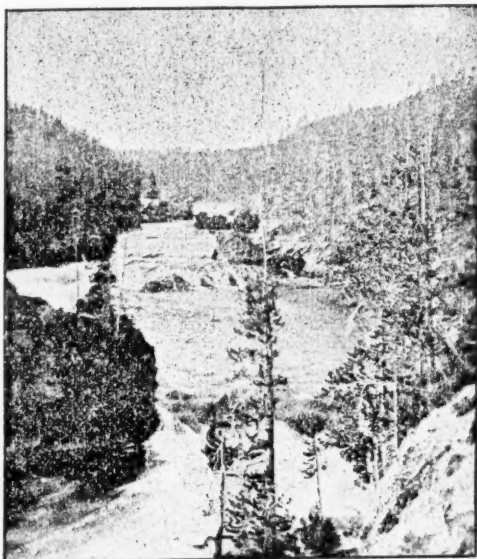
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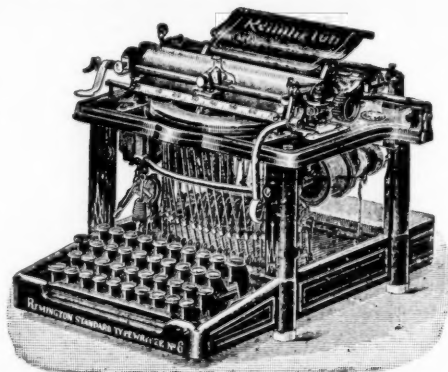
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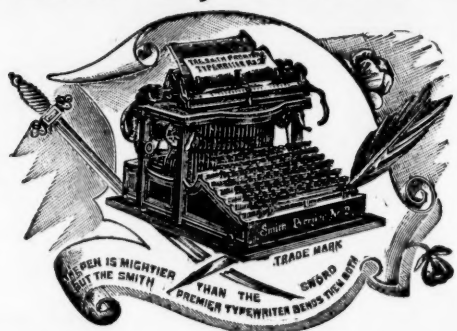
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Dr. Wm. H. Dall, Smithsonian Institution, Pres. of the Phil. Society of Washington.  
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Hon. Charles D. Walcott, Director of the U. S. Geological Survey.  
Mrs. Fannie B. Ward.  
Mr. Bailey Willis, U. S. Geological Survey.

PRINCIPAL CONTENTS OF RECENT NUMBERS.

**JANUARY.**—Russia in Europe, with map, Hon. Gardiner G. Hubbard; The Arctic Cruise of the U. S. Revenue Cutter "Bear," with illustrations, Dr. Sheldon Jackson; The Scope and Value of Arctic Exploration, Gen. A. W. Greely.

**FEBRUARY.**—Venezuela: Her Government, People, and Boundary, with map and illustrations, William E. Curtis; The Panama Canal Route, with illustrations, Prof. Robert T. Hill; The Tehuantepec Ship Railway, with maps, E. L. Corthell, C. E., LL. D.; The Present State of the Nicaragua Canal, Gen. A. W. Greely; Explorations by the Bureau of American Ethnology, W. J. McGee.

This number contains a map of the valley of the Orinoco, showing the extent of territory drained by that waterway and the bearing it has on the Venezuelan question, specially compiled for **THE NATIONAL GEOGRAPHIC MAGAZINE** by T. Heyward Gignilliat, of the U. S. War Department.

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